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N.B.—Figures in brackets denote that the adjacent number contains so many items noted, but not abstracted.

MISCELLANEOUS.

General.

1456. PAWLEY, W. H., AND OTHERS. 634/635(94)

Technical efficiency in the rural industries.

J. Aust. Inst. agric. Sci., 1944, 10: 45-56.

This report was compiled from statements by members of the New South Wales Branch of the Australian Institute of Agricultural Science and submitted to the Rural Reconstruction Commission in March 1944. Among the topics dealt with are some of special interest to horticulturists. *Fruit and vegetable industries.* Emphasis is laid on the extension of preservation and the following suggestions are made: Development of central packing houses; adoption of refrigerated cars and louvered vans; erection of more cool and gas stores and common storage of waxed hard vegetables and apples in cool Tableland areas during winter and early spring; canning of tomatoes, peas, asparagus, lima beans, green beans, beet, carrots and cabbage; replacing sun drying of cut fruit and prunes by dehydration and some further improvements in drying processes; adoption of quick freezing for certain products; establishment of juice production and manufacture of suitable by-products. To maintain vegetable production arrangements for marketing and distribution should be made. The development of vegetable growing in 6 main areas should be encouraged and seed production should be expanded. The recommendations for fruit growing are: Citrus: Orange juice production; research on soil fertility and black spot control in the coastal areas; selection of resistant stocks and lighter soils in other citrus areas. Dried grapes: Methods of bringing about a more uniform annual production should be examined. Pome fruits: Production of late apples in Tableland areas and of summer apples in earlier districts should be increased. Prunes: The poor cropping of Robe prune and the premature dropping of d'Agen in the Murrumbidgee Irrigation Areas could be controlled. A certain amount of apricot and peach growing for dehydration in prune growing areas is desirable. Cherry growing presents limited possibilities of expansion. A wider cultivation of nut trees, e.g.

almonds, walnuts, pecans, etc., in inland irrigated areas is worth considering. The Australian requirements of olive oil and pickled olives could be produced in the Commonwealth, if growers were given initial financial assistance by the Government. Banana growing should be extended, supplemented by beans in the early and late stages and in association with avocados. Papaw, mango and pineapple growing could also be extended. *Weeds.* A research programme for weed control is outlined and the setting up of a standing committee is recommended. *Fertilizers.* The chief suggestions with reference to horticulture are: Greater attention to time of application and placement of fertilizers for vegetable crops, more extensive use in orchards of phosphate and nitrogen for green manure crops, extension of fertilizer research to make utilization of poorer soils for fruit and vegetable growing economical. *Irrigation.* There is not sufficient personnel to provide adequate research and extension services. The training of irrigation specialists is therefore the most urgent present need. With fruit and vegetables the quantity of water that produces the highest yields is considered to be, in general, the most economical amount.

1457. GÖKGÖL, M. 631.531(56)

The aims of the seed improver in Turkey and how they are to be achieved. [Turkish.]

Ziraat Dergisi, 1943, 4: 39: 10-3.

It would appear from this article that agriculture and horticulture in Turkey are very backward and the varieties cultivated long out of date. The author quotes as an instance the fact that many of their pea and bean varieties have to be boiled all day before they can be eaten. Turkey has a climate which could grow a wide variety of crops, it is even suggested that quinine and coffee would grow on the Mediterranean coast of Turkey. As regards ordinary crops seed selection is a necessity. A number of seed improvement stations exist for cereals and other plants, but even if local needs are to be satisfied, a great deal still remains to be done.

Technique.

1458. SAUNDERS, A. R. 519:63
Efficiency of design in field experiment at Potchefstroom, South Africa.
Emp. J. exp. Agric., 1944, 12: 157-62, bibl. 17.

Data are presented [from trials with maize, soybean and other crops] on the efficiency of lattice, balanced-lattice, lattice-square, balanced incomplete-block, and split-plot designs. Lattice designs gave an average increase in efficiency of 29%, balanced lattices 52%, lattice squares 134%, and balanced incomplete blocks 37%, with recovery of inter-block information. Split-plot arrangements resulted in a considerable loss of information on main-plot comparisons and an appreciable gain on sub-plot comparisons. [Author's summary.]

1459. HAMNER, K. C. 581.084.1
A chamber for growing plants under controlled conditions.
Bot. Gaz., 1944, 105: 437-41, bibl. 2.

A chamber is described in which plants of Biloxi soybean, red kidney bean, tomatoes and other plants were successfully grown from seed to maturity at Ithaca, N.Y., with relatively accurate control over environmental factors. Preliminary work had shown that white fluorescent tubes alternating with daylight tubes provided the most satisfactory illumination. Tomatoes grown in these chambers from November to April produced nearly twice as much vegetation as those in the greenhouse during the same period, but outdoor tomato plants in summer yielded about 30% more dry weight and 50% more fruit. Possibly a lowering of the temperatures in the control chamber during the dark period would have improved this result. Two diagrammatic cross-sections and a photograph of a weekly hygrothermograph page illustrate the description.

1460. CHESTER, K. S., AND RAY, W. W. 631.544.4
Thermoregulation in the experimental greenhouse.
Bot. Gaz., 1944, 105: 435-7.

A description is given of a thermostatically controlled projection steam heater, which was installed in two experimental greenhouses at the Oklahoma Agricultural Experiment Station, Stillwater. A photo of the thermograph record for a week in January proves the efficiency of the installation, the usefulness of which is limited to periods with outdoor temperatures of 10° F. lower than the desired greenhouse temperature. The cost of the equipment is given as \$200 per house and its significance for the breeder and the pathologist is briefly discussed.

1461. HUBERTY, M. R. 631.51: 631.432
Soil management in relation to water penetration.
Calif. Citrogr., 1944, 29: 178-9.

Soil compaction can have great influence in reducing the rate at which water will enter the soil. Heavy applications of ammonium sulphate will cause soil compaction by acidifying the soil and preventing the proper nitrification of the ammonia. This is not likely to happen on soils high in calcium, and if it occurs it can be remedied by the addition of organic matter and/or calcium (gypsum). The suggestion that disc harrowing instead of mould-board ploughing will prevent formation of a hard pan has been disproved. Hard pan and surface compacting can be reduced, if ploughing is done when the soil can adequately support the equipment without undue consolidation and yet is not so dry that a dust mulch forms.

Growth substances.*

1462. MITCHELL, J. W., AND RICE, R. R. 577.15.04
Plant growth regulators.
Misc. Publ. U.S. Dep. Agric. 495, 1942, pp. 75, bibl. 89, 20 cents.

A compilation of results of work done by the U.S. Bureau

* See also 1504, 1535, 1540-1542, 1553, 1564, 1565, 1762, 1785, (1803), 1807, (1816).

of Plant Industry and many other investigators associated with various institutions and governmental agencies. The subjects covered are the preparation of plant growth substances, their value and manner of use in the treatment of cuttings, in the control of pre-harvest fruit drop, in transplanting and their possible future in other directions such as increasing fruit size, production of seedless fruit, the stiffening of plant stems, inhibition of premature sprouting of stored bulbs and seed treatment. Pages 14-64 give in tabular form the results of the use of various specified growth substances on the rooting of a very large number of plants classified according to type, e.g. conifers, broad leaf trees, shrubs and herbaceous plants.

1463. DEXTER, S. T. 631.531.17: 577.15.04
Commercial hormone dusts for seed treatment:
A second report.*
Quart. Bull. Mich. agric. Exp. Stat., 1943, 25: 279-82, bibl. 3.

No benefit was derived from treating seeds of a number of agricultural and horticultural crops with commercial hormone dusts, previous trials with sugar beets having given equally negative results.

1464. MITCHELL, J. W., AND HAMNER, C. L. 577.15.04
Polyethylene glycols as carriers for growth-regulating substances.
Bot. Gaz., 1944, 105: 474-83, bibl. 3.

1. Addition of Carbowax compounds to aqueous solutions of 2,4-dichlorophenoxyacetic acid increased the effectiveness of the acid in bringing about growth responses and form changes in kidney bean plants as measured on a quantitative basis. 2. Marked form changes occurred in roots, hypocotyl, first internode, and terminal and lateral buds as the result of application of 4 γ of the acid to one primary leaf of seedling bean plants. Application of 1 γ of the acid in a like manner resulted in greatly inhibited bud growth. 3. A 0.5% solution of Carbowax 1500 was found to be non-toxic to several kinds of crop plants. 4. Application of relatively high concentrations of 2,4-dichlorophenoxyacetic acid in solution with Carbowax killed the bean plants when applied either to the soil or above-ground portions. The possibility of using this compound, and various others together with Carbowax, as selective herbicides is suggested. 5. A relatively simple quantitative method of measuring the effectiveness of growth-regulating compounds in bringing about growth responses is described. It is based on the application of exact amounts of the substance to a bean leaf and the subsequent measurement of the growth changes in the stem and buds. [Authors' summary.] The study was conducted at the Bureau of Plant Industry, Soil and Agricultural Engineering, Beltsville, Maryland.

1465. STOUTEMYER, V. T. 577.15.04
The influence of changes in molecular configurations of several naphthyl growth substances on the rooting responses of cuttings.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 529-32.

Both composition and molecular configuration are shown to be important factors in determining the activity of growth substances.

1466. COOPER, W. C. 577.15.04
The concentrated-solution-dip method of treating cuttings with growth substances.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 533-41, bibl. 6.

Excellent results were obtained with derris, cinchona and cacao, both cuttings and marcots, by the use of concentrated solutions of various growth substances.

* For previous article see *ibidem*, 1942, 24: 245-8, H.A., 12: 937.

1467. SHIVE, J. W. 577.15.04
B₁. Its use as a growth regulating substance for green plants.
Circ. N.J. agric. Exp. Stat. 399, 1940, pp. 7, bibl. 5.
Sifting the claims made on behalf of the action of vitamin B₁ as a growth stimulant in plants the author states that the vitamin may be used effectively in the rooting of cuttings of certain, particularly slow-growing species, once root development has been initiated.
- Physiological and chemical phenomena.*
1468. FELBER, I. M., AND GARDNER, V. R. 631.432
The effect of a hydrophilic colloid of high viscosity on the water loss from soils and plants.
Tech. Bull. Mich. agric. Exp. Stat. 189, 1944, pp. 30, bibl. 6, abstracted in *Proc. Amer. Soc. hort. Sci.* for 1943, 1943, 43: 183-4.
Evaporation losses from bare soils and potted plants were reduced 30 to 50% by applying a 1 or 2% aqueous dispersion of methylcellulose to the soil. The value of this discovery to horticulture and agriculture in temporary drought conditions is pointed out.
1469. WEINTRAUB, R. L. 581.035: 581.12
Radiation and plant respiration.
Bot. Rev., 1944, 10: 383-459, bibl. 332.
A review of the literature supports the conclusion that, under some conditions, an increase of the rate of "apparent" respiration, as measured by gaseous exchange, may be induced by irrigation of various species of plants and types of plant tissues. In the present elementary state of our knowledge it cannot be decided with certainty whether or not the observed stimulations are directly related to the "true" respiration. Despite the long-continued interest in this problem the results thus far available are almost entirely of a descriptive nature, and in no single case has here been presented, as yet, a satisfactory elucidation of the mechanism involved. From a consideration of the diverse conditions and types of material with which no alteration of the gaseous exchange has been observed, it seems altogether likely, however, that such an effect may be the common end result produced by a variety of phenomena. [Author's summary.]
1470. THOMAS, M. D., HENDRICKS, R. H., AND HILL, G. R. 581.12: 581.13
Apparent equilibrium between photosynthesis and respiration in an unrenewed atmosphere.
Plant Physiol., 1944, 19: 370-6, bibl. 3.
The minimum concentration of carbon dioxide, to which an unrenewed atmosphere could be reduced by photosynthesis, was sought. A value of 40 p.p.m. was found for sugar beets at 15° C. The apparent equilibrium between photosynthesis and respiration was dependent on the temperature and the light intensity. In grain and sugar beet experiments the minimum equilibrium concentration agreed satisfactorily with values calculated from independent respiration and photosynthesis data. The method should be useful for fundamental studies in the field. [Authors' summary.] The article originated from the Department of Agricultural Research, American Smelting and Refining Co., Salt Lake City.
1471. YARWOOD, C. E., AND HAZEN, W. E. 581.144.4
The relative humidity at leaf surfaces.
Amer. J. Bot., 1944, 31: 129-35, bibl. 14.
The methods and data of this paper are applicable only to limited situations where radiation at the leaf surface is low and the leaf temperature is conditioned mainly by the rate of transpiration. In a laboratory environment of 22° C. and 51% relative humidity, the relative humidity at various leaf surfaces varied from 52% for the upper surface of old *Pittosporum* leaves to 83% for the lower surface of bordeaux-sprayed young bean leaves. The studies were made at the University of California.
1472. LENDNER, A. 631.535: 581.143.27
La polarité dans le bouturage. (Polarity in cuttings.)
Rev. hort. Suisse, 1942, 15: 265-8.
Describes and illustrates polarity in cuttings seen in his own trials with horse-radish and in those of Schopfer with *Sansevieria zeylanica*. What causes polarity is still unknown.
1473. RUBIERO, F. 631.531.17
Influence of sulfanilamide on the germination of seeds.
J. biol. Chem., 1944, 152: 665-7.
The influence of sulfanilamide on the germination of seeds was tested at the University of São Paulo, rice being used as the test plant. A solution of 1: 10,000 was found to retard embryo development; a solution of 1: 2,000 had a more marked effect without killing the embryo.
1474. SCHANDLER, H. 631.46
Untersuchungen über den Stickstoffhaushalt von Nichtleguminosen und Leguminosen. (Investigations on the nitrogen balance of non-leguminous and leguminous plants.)
Planta, 1943, 33: 424-57, from abstract *Gartenbauwiss.*, 1944, Vol. 18, abstr. pp. 35-6.
Results obtained at the Geisenheim research station indicate that a large number of non-leguminous plants are capable of utilizing atmospheric nitrogen. In particular the blackberry and certain composites are claimed to be almost equal to leguminous plants in this respect. The author makes the further claim of having isolated bacteria from non-leguminous plants which are able to assimilate elementary atmospheric nitrogen. These bacteria are supposed to have been transformed into plasmatic organs of the host cells, where they occur as bacteroids without a membrane and in a deformed shape. In a discussion of the paper in *Gartenbauwissenschaft* certain objections to the theory are raised and it is regretted that the account given is not detailed enough to allow of a full judgment. It is, however, suggested that the work is sufficiently sincere to warrant a re-investigation by other workers and possibly with different methods.
1475. WILSON, J. K. 631.416.1
Nitrous acid and the loss of nitrogen.
Mem. Cornell agric. Exp. Stat. 253, 1943, pp. 36, bibl. 98.
The data obtained from a study of the part taken by the nitrite in the juice of plants, as well as that in the water exuded from plants, in the natural loss of nitrogen leads to the conclusion that the *Gramineae* (and all other plants) reduce the nitrate in the soil, in the process of assimilation, to nitrite. Some of the nitrite may appear as nitrous acid, owing to the presence of hydrogen ions and thus react chemically with several substances (urea, ammonia, amines, glucose, formaldehyde) either in the plant or in its exudate, to create a chemical loss of nitrogen. It is suggested that the large unaccountable loss of nitrogen reported in fertility studies over a period of 75 years may be due almost entirely to these results of plant exudation.
1476. BEIRNAERT, A., AND DE POERCK, R. 631.52
(22) Sur les principes qui sont à la base de l'amélioration des plantes. (Basic principles of plant improvement.)
Bull. agric. Congo belge, 1942, 34: 155-81.
BENNET-CLARK, T. A., AND BEXON, D. 576.341
Water relations of plant cells. III. The respiration of plasmolysed tissues.
New Phytol., 1943, 42: 65-92, bibl. 32.
BERGER, J., AND AVERY, S., JR. 577.15.04
Isolation of an auxin precursor and an auxin (indoleacetic acid) from maize.
Amer. J. Bot., 1944, 31: 199-203, bibl. 19.

- BERGER, J., AND AVERY, S., JR. 577.15.04
Chemical and physiological properties of maize auxin precursor.
Amer. J. Bot., 1944, 31: 203-8, bibl. 13.
- BIZZELL, J. A. 631.41: 620.158
Lysimeter experiments. V. Comparative effects of ammonium sulfate and sodium nitrate on removal of nitrogen and calcium from the soil.
Mem. Cornell agric. Exp. Stat. 252, 1942, pp. 23.
- BURGOS, J. J. 551.56: 581.5
Características del clima de La Plata y algunas de sus consecuencias fitoecológicas. (The climate of La Plata and its effects on plant ecology.)
Rev. argent. Agron., 1944, 11: 116-28, bibl. 14.
- CHAPELOW, H. C., AND TYDEMAN, H. M. 551.56
Weather conditions during 1943.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 47-9.
- CHILDERS, N. F. 77: 634/635
The Speed Graphic synchronized flash camera in horticulture.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 319-22.
- DAWE, C. V. 331: 634/635: 631.16
The cost of farm labour in wartime.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 158-60.
- EMMERT, E. M. 581.192
Use of monochloroacetic acid to include ammonia in the "soluble nitrogen" tissue test.
Plant Physiol., 1944, 19: 562-3.
- HOUGH, L. F., AND WELKER, E. L. 519
Combining genetically different samples for correlation analysis.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 155-9, bibl. 3.
- JOY, A. B. 631.83
Determination of potassium in fertilizer mixtures. Removal of ammonia and organic matter without ignition.
Industr. Engng Chem. (Analytical Edition), 1944, 16: 383-4, bibl. 6.
- LEACH, W., MOIR, D. R., AND BATHO, H. F. 581.12
An improved arrangement for the measurement of carbon dioxide output of respiring plant material by the electrical conductivity method.
Canad. J. Res., 1944, 22, Sec. C, pp. 133-42, bibl. 11.
- ROESSLER, E. B., AND LEACH, L. D. 519: 63
Analysis of combined data for identical replicated experiments.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 323-8, bibl. 5.
- ROYAL METEOROLOGICAL SOCIETY. (GUNTON, H. C.) 551.506.8
33rd Phenological Report 1943.
Roy. met. Soc., 49 Cromwell Road, London, 1944, pp. PR 32, 3s., issued in error as *Quart. J. roy. met. Soc.* No. 304.
- GUNTON, H. C.
Discussion on the report of the phenological observations in the British Isles from December, 1942, to November, 1943.
Quart. J. roy. met. Soc., 1944, 70: 141-4.
- SEN, A., AND VISWANATH, B. 631.41: 620.158
Drain gauge (lysimeter) studies at Pusa during thirty years.
Ind. J. agric. Sci., 1943, 13: 531-46, bibl. 17.
- SMITH, H. V. 631.41: 620.158
A lysimeter study of the nitrogen balance in irrigated arid soils.
Tech. Bull. Ariz. agric. Exp. Stat. 102, 1944, pp. 259-308, bibl. 39.
- SMITH, J. H. C. 633.85: 581.13
Concurrency of carbohydrate formation and carbon dioxide absorption during photosynthesis in sunflower leaves.
Plant Physiol., 1944, 19: 394-403, bibl. 19.
- TURRELL, F. M. 581.144.4: 581.11
Correlation between internal surface and transpiration rate in mesomorphic and xeromorphic leaves grown under artificial light.
Bot. Gaz., 1944, 105: 413-25, bibl. 23.
- YATES, F., BOYD, D. A., AND MATHISON, I. 631.8
The manuring of farm crops: some results of a survey of fertilizer practice in England.
Emp. J. exp. Agric., 1944, 12: 163-76.
Refers to staple agricultural crops.
- YEE, J. Y. 631.8
Determining hygroscopicity of fertilizers.
Industr. Engng Chem. (Analytical Edition), 1944, 16: 367-9, bibl. 3.

TREE FRUITS, DECIDUOUS.

General.

1477. HUGHES, H. M. 634.1/7
The amateur's fruit garden.*
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 94-9, bibl. 4.
Practical hints which, with the aid of diagrams of three demonstration fruit gardens laid out at Bradbourne, East Malling, should be of great help to the English amateur wishing to dispose of suitable ground covering areas of about 45 × 68 ft. or 45 × 30 ft. Among points discussed are (1) the considered planning of such a garden; (2) economic utilization of ground, wall and fence space; (3) correct grouping of kinds and varieties of fruits; (4) the selection of rootstocks; (5) choice of varieties; (6) routine work necessary.
1478. BARKER, B. T. P. 634.11: 663.3
The production of cider fruit on bush trees. Vintage quality trials. Progress report No. 1, 1942 crop.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 124-35.
The lay-out and early pomological aspects of this trial of cider apples on bush trees were described by Swarbrick, *ibidem* for 1941, p. 11 and *ibidem* for 1942, pp. 13-7 (H.A., 12: 796 and 13: 738). In the present report a record is given of the first tests on vintage quality of fruit so grown. Results of examination of available fruit of the 1942 crop from five of the trial centres are summarized and discussed. Detailed analyses and notes on vintage quality are available at Long Ashton but are not published here. The following general conclusions are drawn: (1) Locality has distinctive effects on vintage quality in the matter of specific gravity, juice fermentation rates, acid, nitrogen and tannin content

* See also *J. roy. hort. Soc.*, 1943, 68 : 361-74, H.A., 14 : 33.

and on body of cider. (2) This influence has in general been seen in all varieties. (3) Despite this influence varieties have retained their varietal vintage characters. (4) No clear effects of rootstock have been apparent. (5) Vintage quality fruit can be produced on bush trees.

1479. MONTGOMERY, H. B. S. 634.11-1.546.6
Cordon culture of apples.
A.R. East Malling Res. Stat. for 1943, A27,
1944, pp. 77-80.

A popular account of how to grow apples on cordons. Of the rootstocks recommended, M. IX gets first preference. Others are M. I, M. II, M. IV and M. VII: these will need more pruning. Soil and aspect, wiring, pruning, pest and disease control and the benefits of thinning are all discussed.

1480. HOBBS, E. W. 634.11
Observations on planting distances in apple
plantations in the Bristol Province.
A.R. Long Ashton agric. hort. Res. Stat. for 1943,
1944, pp. 15-24.

In this highly informative article based on observation on different plantations the writer warns against overcrowding. Among recommendations particularly applicable to West Country conditions are the following: Fillers on Malling IX stock can be used for the first ten years or trees may all be planted on the same stock doubly thick with the determination to grub every other tree when necessary. If this is done, then (a) planting must be done on the square system and (b) spacing must be so arranged that the permanent trees are not too far apart. It is suggested that a 24 ft. square plant (75 trees per acre) would be economic spacing for dessert bush apples on such a stock as Malling II. Fillers on M. IX could be planted in between. Where necessary, plantation thinning by grubbing will prove much more satisfactory than hand pruning, cutting-up or de-horning. Such thinning may in fact lead to heavier crops in two or three years' time. It should be followed by intensified cultural and manurial practice in order rapidly to get good leaf surface and new growth into the trees, and pruning practice should aim at using this new growth to the full. De-horning, which is no remedy for overcrowding, is useful for rejuvenating unsatisfactory trees and coupled with proper cultural methods can result in a striking renewal of young wood.

1481. OVERHOLSER, E. L., OVERLEY, F. L., AND
ALLMENDINGER, D. F. 634.13+664.85.13
Pear growing and handling in Washington.
Pop. Bull. Wash. agric. Exp. Stat. 174, 1944,
pp. 84, bibl. 64.

Washington's pear production, which is only surpassed by that of California, amounted to 6-7 million bushels in 1942, of which 5-1 million bushels were Bartlett (Williams). The bulletin is a comprehensive up-to-date guide on the cultivation, harvesting and subsequent handling of pears in Washington. Considerable attention is paid to the control of pests and diseases and to the use of refrigerator cars for transport on rail.

1482. HOBLYN, T. N. 634.13-1.55
The production history of three experimental
pear plantations at East Malling, 1921-43.
A.R. East Malling Res. Stat. for 1943, A27,
1944, pp. 71-7, bibl. 1.

Observations for some years on three plantations of pears, mainly on quince stocks and ranging up to 22 years, are here summarized. Seasonal conditions have more influence on the time at which pears reach full bearing than on the similar stage of apples. Even on quince some varieties are very slow to come into bearing while others may be bearing a crop of a bushel (=48 lb.) in about the eighth season from planting. Self-rooted trees or trees on pear rootstocks are comparatively slow to bear. Conference and some other varieties are fairly regular bearers, others are much

more irregular. The average yield of a mature plantation of mixed varieties is 180-250 bushels per acre according to distance of planting.

1483. BARANOV, N. 634.63: 665.327.3
Die Ölproduktion und die Ölbaumschädlings-
forschung in Kroatisch-Dalmatien. (Olive oil
production and pest control in Dalmatia.)
Forschungsdienst, 1942, 14: 196-9.

There are about 1-9 million olive trees in the Croatian part of Dalmatia, producing on the average 1 kg. of oil each. The pests *Dacus oleae* and *Prays oleellus* are supposed to be responsible for this most unsatisfactory yield and a plan is worked out according to which it could be largely increased by the introduction of control measures at comparatively low cost.

Breeding and varieties.

1484. TYDEMAN, H. M. 634.11-1.523
A preliminary account of experiments in breeding
early and midseason dessert apples.
A.R. East Malling Res. Stat. for 1943, A27,
1944, pp. 34-42, bibl. 8.

The author discusses progress made in raising a series of new apples similar in appearance to Worcester Pearmain but varying from it in their times of maturity. Details are given of the inheritance of certain characters of the tree, flowers, foliage and fruit. Of seedlings of known parentage so far selected, 19 appear likely to prove valuable as new dessert apples. Of these, three, at present designated 431, 432 and 435, would seem most likely to extend the season of the Worcester Pearmain type apple. They are described in detail.

1485. FISH, V. B., DUSTMAN, R. B., AND MARSH, R. S. 634.11: 577.16
The ascorbic acid content of several varieties of
apples grown in West Virginia.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 196-200, bibl. 3.

The study included 13 varieties of apple and notes were made of effect on ascorbic acid content of time of picking and of storage of apples picked at approximately the same stage of maturity. Red Duchess headed the list with 20 mg. per 100 g. fresh tissue and McIntosh was bottom with 6-9 mg.

1486. SOUTHWICK, L., AND FRENCH, A. P. 634.22-1.521
The identification of plum varieties from non-
bearing trees.
Bull. Mass. agric. Exp. Stat. 413, 1944, pp. 51,
bibl. 8.

This bulletin is the fifth of a series from Massachusetts Experiment Station on the identification of fruit varieties from nursery and non-bearing trees, three of the previous papers having dealt with apples and one with cherries. Distinguishing characters are to be found in habits of growth, bark colour and surface character, colour and pubescence of shoots, colour of growing points, characters of petiole and glands, size, shape and degree of folding of leaf blade, character and shape of leaf tip and leaf margin, the nature of the upper leaf surface, amount of light reflection from the leaf, leaf colour, serrations and pose. Wherever possible the degrees of difference within each of these characters have been photographed; thus there are 10 photographs illustrating different types of glands, 6 of leaf shape, 6 of leaf serration, 3 of light reflection. A photograph of a characteristic shoot with a description of the prominent characteristics is given of each of the 57 varieties described. These comprise both European and Japanese plums and their hybrids and are selected as being commonly found in commercial nurseries, though it is not claimed that the list is by any means complete. There are separate keys for

the European and Japanese varieties, followed by full variety descriptions of each sort. Even so it is stressed that the characteristics of nursery trees cannot be learned satisfactorily from printed descriptions or illustrations but that much time must be spent in close observation, to which this bulletin should be a considerable aid.

1487. ANON. 634.23-1.523

The "Ron's" seedling cherry.

Agric. Gaz. N.S.W., 1944, 55: 297-8.

A brief account of the behaviour and the growing popularity of the new dessert cherry variety Ron's Seedling raised in the Young District, New South Wales, in 1928. The cherry is described as an exceedingly heavy cropper, the fruit resembling, but in several respects superior to, St. Margaret and ripening a week to ten days before that variety; it will carry in first class condition, even when fully matured, and withstands the cracking effect of rain to a certain extent. Up to the present time 70-100 acres in the district have been planted up and re-worked to the new variety, but its cultivation seems likely to expand greatly in the near future. The breeder, Mr. Thornell, advocates fairly severe cutting every second year to overcome its habit of excessive cropping—noticeable especially in early years—which leads to dwarfing. It thrives on mahaleb and Kentish rootstocks but not on mazzard.

1488. JOLEY, L. E. 634.23: 581.162.3

Notes on variation and self-sterility in the Mahaleb cherry.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 103-5, bibl. 8.

Physiological as well as established morphological differences are suspected to occur in mahaleb cherry (*Prunus mahaleb*) and showed themselves at Glenn Dale Plant Introduction Gardens, Maryland, in differences in vigour and transplanting recovery between seedlings from seed of Dutch and Russian origin respectively. The Russian seed showed very high germination, the Dutch much less. The existence of self-sterility in the mahaleb is demonstrated. These points are important in the raising of seedling stocks. Vegetative propagation by layering, the author considers, exposes stone fruit to the spread of various diseases.

1489. HARPER, R. S. 634.25-1.521

Some new canning peach varieties. American hybrids available for commercial planting.

J. Dep. Agric. Vict., 1944, 42: 181-6.

The shortcomings of many canning peach varieties grown in the Goulburn Valley, Victoria, and the Murrumbidgee Irrigation Area, New South Wales, caused W. Young of Kelvin Orchard, Ardmuna, to introduce into Australia scions of 13 peach hybrids raised by W. F. Wight, U.S. Department of Agriculture Experimental Orchard at Palo Alto, California, in January 1935. Trees of all 13 varieties were successfully established in Victoria, both at Kelvin Orchard and at the Horticultural Research Station, Tatura, where they are kept under close observation. The present article is a preliminary but detailed report on the cropping habits of the new varieties, whose botanical description is reserved for a later issue. It is too early yet to judge the performance of the collection or to allow of large scale commercial plantings, but it can be noticed that canners and growers show particular interest in the early maturing varieties.

1490. DE WET, A. F. 634.25

The new dessert peach "Boland".

Fmg. S. Afr., 1944, 19: 381-2, 390.

The new peach variety Boland was raised from white-fleshed clingstone seed at Elsenburg. The fruit which ripens early, just prior to Peregrine, is described as juicy with a fine flavour and of good keeping quality. The tree is a good cropper, vigorous and apparently resistant to delayed foliation. It is stated as being worth commercial trial by

growers in the lower-lying areas of the Western Cape Province.

1491. CONDIT, I. J. 634.37

San Piero, the Brown Turkey fig of California.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 211-4, bibl. 15.

The very large Brown Turkey fig of California appears to be the same as that described by Gallezio in Italy in 1820 as San Piero.

1492. MAURI, N. 634.37

Les figuiers cultivés en Algérie. (The cultivation of figs in Algeria.)

Bull. Dir. gén. Agric. algér. 93, 1943, pp. 56, bibl. 9.

A description of the characters and an identification key are given of 29 varieties of fig grown in Algeria, and their merits for use as dessert, fresh or dried, and in confectionery are discussed. Full details are given of cultivation, harvesting and drying and the control of pests and diseases is considered.

Propagation and rootstocks.

1493. RENAUD, M. 634.63-1.541.11

Le greffage des oléastres en Algérie. (Grafting wild olives in Algeria.)

Bull. Dir. Agric. algér. 98, 1944, pp. 23, bibl. 5.

Proposals are made for turning a large proportion of the healthy wild olives growing in different parts of Algeria into profitable trees by grafting them with suitable scions of known cultivated varieties. The actual operations of grafting by cleft, crown or bark methods and of budding by shield or patch methods and the necessary after-care are described in detail. The Government is subsidizing the work by grants subject to certain conditions to individuals and communes.

1494. LARSEN, G. H. 634.1/8-1.537+1.541.11

La pépinière fruitière. (Fruit tree propagation in Algerian nurseries.)

Bull. Inspect. gén. Agric. algér. 82, 1943, pp. 41.

The importance to Algeria of the propagation of fruit trees only from selected parents and by vegetative means is stressed. The bulletin gives instructions on the best method and subsequent treatment to adopt in the case of each variety. There is a preliminary chapter on the lay-out of the nursery and on the various methods of propagation, such as by cuttings, stooling, budding, and grafting. Other methods of propagation are not discussed. *Oranges* are shield budded on sour stock in April when growth is starting or in July-August when the bud is dormant. *Olives* are grown from cuttings or budded on seedling stocks. Those accustomed to budding claim that the seedling stocks are better able to resist drought than plants grown from cuttings, but there is no experimental evidence to prove it. Cuttings are made of shoots 10-50 mm. in diameter, cut about 25-30 cm. long. The thicker cuttings are best if water is scarce. The strong water shoots, which are mostly cut away during pruning, make good cuttings when well lignified. Seeds for stock, if required in quantity, are obtained from the oil refineries, since selection of parent is difficult. The best that can be done is to insist on seeds of a single variety, preferably from one plantation only. Wherever the rainfall does not average more than 300 mm., the olive is propagated from ovuli, the rounded growths at the base of the tree. The method is described. *Almonds* are grafted on seedling bitter stock grown from seed parents selected for their drought-resisting powers. In dry conditions the stocks are best sown on site and budded when large enough. Trees for irrigated country can be raised in a nursery and transplanted. *Apricots* are commonly budded on apricot seedlings, the small common variety, Mish-Mish, being used for ordinary orchard cultivation and the stouter-wooded

kinds such as Bullida for more intensive cultivation. Myrobalan and occasionally peach stock are also used; the myrobalan gives a less resistant tree than the free stock. For *Plums* the principal stock is myrobalan grown from seed or cuttings. *Carob* is grafted on carob seedling. The scions should be from long-podded bisexual parent plants. Seeds used to be obtained from the factories which processed the pods but during the war must be procured as opportunity offers. Germination is hastened if the seeds are soaked at 50° C. or even in cold water, for 48 hours. The stock seeds should be sown on their permanent sites or in pots, since by reason of its long tap root and few laterals the tree transplants badly. Briefer notes are given on the propagation of the pear, cherry, medlar, apple, pear, chestnut, walnut.

1495. REBOUR, H. 634.11-1.541.11
Les meilleures variétés, les meilleurs porte-greffes. (Export fruit varieties for Algeria and recommended rootstocks.)

Bull. Inspect. gén. Agric. algér. 45, 1941, pp. 16.
Notes on varieties are based on recommendations from horticultural advisers in different parts of Algeria. Recommendations on rootstocks do not greatly differ from those given by Bevançon in *Fruits et Primeurs*, 1942, 12: 117-8, H.A., 13: 733. The loquat is included here and the advice is given to work it on seedling loquat, unless quick cropping and a short life are the aim, when quince can be used as stock. For citrus sour orange is strongly recommended as against all other stocks.

1496. TUKEY, H. B., AND BRASE, K. D. 634.11-1.541.11
The congeniality of some American varieties of apples on Mallory rootstocks.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 143-6, bibl. 3.

The results of 210 combinations (40 varieties) with 14 Mallory rootstocks at Geneva Experiment Station, N.Y., over a period of 14 years are listed. No incompatibilities have been found. This contrast with the incompatibilities experienced with U.S.D.A.227 and Virginia crab after only a short period of use suggests that uncongenial strains within each type may have been naturally eliminated, whereas the newer rootstocks have not yet undergone this selective process. There may also be a closer botanical relationship between the American cultivated varieties and Mallory stocks than with Virginia crab and U.S.D.A.227.

1497. BRADFORD, F. C. 634.11-1.541.11
Second year changes in apparent vigor of apple varieties of prospective value as trunk-formers.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 215-20, bibl. 3.

Divergencies noted in Maryland in the growth of 44 apple varieties suggested for use as intermediates show that the second year from the bud introduces new factors influencing growth which cannot be appraised the first year. The traits revealed in the second year are often important.

1498. SUDDS, R. H. 634.11-1.541.11
The effect of the rootstocks on ten years' growth and yield of the Gallia Beauty apple.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 236-8, bibl. 1.

The author adds to the information given previously (*ibidem* 42: 326-34, H.A., 12: 1166). Clonal rootstock 316 and Jonathan seedlings continue to be promising for the production of strong growing trees under W. Virginian conditions.

1499. SHAW, J. K., AND SOUTHWICK, L. 634.11-1.541.11
Certain stock-scion incompatibilities and uncongenialities in the apple.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 239-46, bibl. 12.

In trials in Massachusetts incompatibility was established between clonal stock Spy 227 and certain varieties and

strains of apple which otherwise appeared identical. It appeared in retarded growth, premature leaf colouring and abscission and death. There were also indications of incompatibility between some types of flowering crab apple and certain dwarfing clones such as Mallory III, IV and IX.

1500. SUDDS, R. H. 634.11-1.541.11
Growth and fruitfulness of two apple varieties on French crab seedlings and on a clonal rootstock.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 247-50, bibl. 4.

Material consisted of Winesap and Delicious on clonal rootstocks U.S.D.A. T-200 and on French crab seedlings. Data of growth, yield, etc., for 17 years indicate that causes other than seedling stocks account for most of the variation in growth and production in the deciduous orchards of W. Virginia.

1501. IPATJEV, A. N. 634.11-1.55
Mass fruiting of one year old apples. [Russian.]
Priroda, (Nature), 1942, No. 5-6, p. 127.

In summer 1938 about 10,000 wild Siberian apples were budded with the Siberian variety Ferskaja horosavka in an orchard near Omsk obtained from an unknown large-fruited European variety grown from seed at the so-called forest farm of the Omsk Institute of Agriculture. The budded apples overwintered well and showed good development in the spring of 1940; during that year over 5,000 of them flowered abundantly and subsequently bore fruit [5-20 per tree] of normal size, taste and appearance. The view is expressed that early fruiting in this case was due to the more advanced age of the wild rootstock. It is worthy of note that one-year-old Anisik Omskii apple trees growing in the same orchard did not fruit in 1940.

1502. GARNER, R. J. 634.13-1.541.11: 634.14
Double-working and bridging incompatible combinations of pear and quince.
A.R. East Mallory Res. Stat. for 1943, A27, 1944, pp. 80-5.

In this very clearly illustrated article the author describes the operation of double working Williams on quince in the nursery, using Beurré Hardy as an intermediate. For those who already have young plantations of single-worked Williams or similarly disposed varieties on quince he explains the process of bridging such combinations with Beurré Hardy or Fertility.

Pollination.

1503. TYDEMAN, H. M. 634.11: 581.162.3
The influence of different pollens on the growth and development of the fruit in apples and pears. II.* Fruit size and seed content in relation to fruit drop.
A.R. East Mallory Res. Stat. for 1943, A27, 1944, pp. 31-4, bibl. 7.

An examination of from 60 to 120 fruits dropped and of a similar number remaining on the tree after the June drop in the case of 2 Cox's Orange Pippin, 2 Worcester Pearmain and 3 Bramley's Seedling trees showed that there was a very close correlation between fruit size and seed content, and that on the average the dropped fruits contained fewer seeds.

1504. HILTON, R. J. 581.163: 577.15.04
Parthenocarpic fruit production in horticultural plants.
Sci. Agric., 1944, 24: 451-5, bibl. 9.

Parthenocarpic fruit were easily induced by treatment with plant hormone chemicals of petunia and tomato flowers. The method was to apply the hormone in lanoline paste either to the stigmas, to the ovary apex where the style emerges, to the base of individual flowers or to the cluster

* For I, see *A.R. for 1937*, A21, pp. 117-27, H.A., 8: 684.

base in plants bearing flowers in clusters. The treatments were made one to three days after emasculation, when the stigmas were in a receptive condition. The hormones were also applied by sprays. In treatment of tomatoes the effective concentrations of naphthaleneacetic acid ranged from 0.01% to 5.0% in lanoline paste with injury to fruit and pedicel above 0.5%, and from 0.005% to 0.25% in spray form, injury occurring from 0.1% upwards. When these treatments were applied to apples in the hope of producing a set of seedless fruit in a season unsatisfactory for natural pollination, no results were obtained.

Growth and nutrition.

1505. PASSECKER, F. 634.1/2: 581.14
Jugend- und Altersformen bei den Obstgehölzen.
(Juvenile and mature forms of fruit trees.)
Gartenbauwiss., 1944, 18: 219-30, bibl. 6.

Seedlings of cultivated tree fruits usually show three phases in their development, a juvenile, a transition and a mature phase, the first and the last being especially distinct in apricots, where the transition, as a rule, occurs at the end of the second year. Generally, the juvenile forms exhibit the character of the wild tree, whilst the mature forms resemble more closely the cultivated type. Varieties are always mature forms. The juvenile phase, in contradistinction to the mature phase, is characterized by its willingness to root and to form a compatible union with scions. In extensive experiments, conducted by the author in Vienna, none of his numerous apple, pear, plum, apricot, peach, citrus, kaki and olive cuttings from juvenile forms failed to root. This juvenile character is of great practical importance for the propagation of seedling rootstocks. But it should be also possible to propagate new varieties by cuttings, if breeders preserve the juvenile form of new varieties as they arise. Such a preservation of the juvenile stage would further help to control degeneration of aging varieties. The time of transition from the juvenile to the mature phase is genetically determined, but it is also influenced by environmental factors. All factors promoting vigorous growth appear to hasten the transition, whereas all factors which check growth and certain propagation and pruning methods seem to have a delaying effect. Photographs are given showing the shape of leaves during the juvenile and mature phase.

1506. SISLER, G. P., AND OVERHOLSER, E. L. 634.11: 581.036
Influence of climatic conditions on date of full bloom of Delicious apples in the Wenatchee Valley.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 29-34, bibl. 2.

Air temperature alone appeared to have any consistent influence on date of full bloom.

1507. WEGER, N. 551.56: 634.1/7: 581.145
Witterung und Blühbeginn bei Obstbäumen.
(Climate and inception of flowering in fruit trees.)
Dtsch. Obstb., 1943, 58: 4-5, from abstract
Gartenbauwiss., 1944, Vol. 18, abstr. p. 33.
Meteorological data recorded at Geisenheim in the years 1936-42 show that there is no relation between soil temperature and the inception of flowering in apple trees. The air temperature, however, was found to determine both the beginning and the progress of the blossoming period. By means of phenometric observations and temperature sum* calculations it was possible to forecast for different localities the dates before which flowering would not start. Forecasts in the daily press for the Rhine Province and climatically similar districts have given satisfactory results.

* See also *H.A.*, 1941, 11: 393.

1508. DORSEY, M. J., AND HOUGH, L. F. 634.11-1:523

Relation between seedling vigor and tree vigor in apple hybrids.

Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 106-14, bibl. 4.

Factors other than those that influence the 2-year height of seedling apples play a major part in determining the height at the ninth year in the orchard. It is, therefore, unsafe to discard the less vigorous seedlings at 2 years on the assumption that their backwardness is due to a genetic factor likely to exert a permanent influence.

1509. PIENIAZEK, S. A. 664.85.11: 581.11
Physical characters of the skin in relation to apple fruit transpiration.

Plant Physiol., 1944, 19: 529-36, bibl. 13.

At Rhode Island Experiment Station, U.S.A., no correlation was found between thickness of cuticle and rate of transpiration in the fruit of four varieties of apple. The lenticels were responsible for from 8% to 25% of the total transpiration and were slightly more effective after harvest than later in storage. Their number and size could not be correlated with transpiration rate. Pronounced surface russetting increased water loss; the waxy bloom on the skin greatly diminished it. The wax deposit differs with the variety, those with a heavy deposit (Rhode Island Greening) lose water much more slowly than those with a thin coating (Golden Delicious). The cleaning off of the surface wax, i.e. polishing the fruit, will increase the transpiration rate permanently.

1510. OVERHOLSER, E. L., BEDFORD, C. L., AND KENWORTHY, A. L. 634.22: 581.45: 631.55

The relation of leaf area per plum to physical properties and chemical composition.

Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 94-8, bibl. 12.

Results for two years are set out in tabular form.

1511. PROESTING, E. L. 634.1/2: 581.144.2
Root distribution of some deciduous trees in a California orchard.

Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 1-4, bibl. 4.

The type of root system produced by deciduous fruit trees in the orchards of the California Agricultural Experiment Station, Davis, under clean cultivation (4-inch depth) was determined by excavation, considered here to be the most satisfactory method of arriving at a true conclusion. The small number of roots found in the surface soil is attributed to high summer temperature. It is probable that surface feeder roots develop in winter and early spring, but this point was not investigated, though from the point of view of fertilizer absorption it is important.

Manuring and soil cultivation.

1512. THOMAS, W., AND MACK, W. B. 581.192: 631.8

Misconceptions relative to the method of foliar diagnosis.

Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 355-61.

A discussion of ideas prevalent on the diagnosis of nutrient requirements by leaf analysis and replies to certain criticisms levelled at the authors' views.

1513. BOYNTON, D., AND BURRELL, A. B. 634.11-1.84

Effects of nitrogen fertilizer on leaf nitrogen, fruit colour and yield in two New York McIntosh apple orchards, 1942 and 1943.

Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 25-30, bibl. 3.

Results of experiments on McIntosh apple trees in two different locations do not entirely agree. Both trials

indicate, however, that the yield is likely to be below optimum when leaf nitrogen in July drops below 1.85% dry weight. The colour data also differ, indicating that better fruit colour may occur in McIntosh at a rather higher nitrogen level at one place than at another.

1514. BOYNTON, D. 632.19: 631.83: 634.25 + 634.23
Responses of young Elberta peach and Montmorency cherry trees to potassium fertilization in New York.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 31-3, bibl. 2.

Severe potash deficiency leaf scorch yielded in nearly every case to two half-yearly applications of 3-3½ lb. 60% KCl in an Elberta peach orchard and to applications of 2-2½ lb. of the same in a Montmorency cherry orchard.

1515. SUDDS, R. H., AND MARSH, R. S. 634.11-2.19-1.841.5
Some further observations concerning injury to apple tree foliage by applications of calcium cyanamid.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 25-8, bibl. 1.

Spring applications of cyanamide in reasonable amount under the spread of branches have resulted in foliage injury two seasons out of seven to mature York Imperial apple trees in a representative West Virginia orchard.

1516. JUDKINS, W. P., AND ROLLINS, H. A. 634.25-1.8
The effect of sod, cultivation and mulch treatments on soil moisture, soil nitrates and tree growth in a young peach orchard [at Connecticut University].
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 7-10, bibl. 11.

Growth of the three-year-old trees was better under cultivation with cover crops or under sod plus mulch than under either a legume or non-legume sod without mulch. Soil moisture was above wilting point for all treatments throughout, and cannot, therefore, have affected these results. The maintenance of a reasonably high supply of soil nitrates in July, when they normally tend to be depleted, was an important factor in promoting vigorous growth.

1517. ROGERS, W. S. 634.1/7-1.4-1.87
Orchard soil management including water conservation and cover cropping.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 85-7, bibl. 3.

Factors relating to orchard soil management including origin of soil, the root zone of fruit plants, water relationships, organic matter, and cultural programmes are briefly discussed. Measures are suggested for conserving or increasing the water supply, and the use of permanent and of mole drains in avoiding water-logging is described. The importance of organic matter is stressed, and methods for maintaining or increasing it by direct application of straw or by various forms of cover crops are described. It is important to suit the cover crop to the soil and climate. [Author's summary.]

1518. SHAULIS, N. J., AND DUNBAR, C. O. 634.25-1.874
Peach orchard cover crop practice varies to suit soils and seasons.
Suppl. 2 to Bull. 446, the 56th A.R. Pa agric. Exp. Stat., 1944, pp. 2, 3, 9.

Recent research by the Fruit Research Laboratory, Arendtsville, shows that the best way to prevent erosion in the local peach orchards, while maintaining the trees in good heart, is to combine cover cropping with clean cultivation. Heavy covers should be grown in the spring when moisture is plentiful, the trees being aided by spring application of nitrogen. These heavy covers are disced in in May or June

and the plant residues are left on the surface, where they do more good than if turned under the soil. The covers must not be sown early enough to compete with the tree growth too soon; July or later should suffice. The covers use much moisture but increase the permeability of the soil surface, so that after heavy rain more moisture is found under them than in clean-tilled orchards, especially on slopes. In an Adams County orchard 1.68 inches of rain falling in 30 minutes penetrated only 2 inches into the soil on the clean-cultivated portion and caused much erosion. On the portion under Korean lespedeza, near by, it penetrated to 14 inches without erosion. A mixture recommended for the locality is composed of crimson clover, winter vetch, millet and rye. The millet shades temporarily the young clover and vetch seedlings and the rye adds bulk to the trashy cover which remains after disking in May.

1519. ROGERS, J. B. 631.459
Soil and water conservation on orchard lands within the Contra Costa Soil Conservation District [California].
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 17-20.

A study of erosion problems and their solution by cover cropping and other methods.

1520. HIBBARD, A. D. 634.25-1.87
The growth of young peach trees under different systems of soil management.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 66-70, bibl. 4.

The systems used can be grouped in three classes, each allowing for four treatments, namely winter covers, summer covers and mulches. They were practised for six seasons. Trees cultivated throughout the growing season grew the most rapidly and those cultivated only once a year produced the least growth. The effects of individual crops were greater than those produced by any class of treatment. Thus the system in which vetch was used produced almost as rapid growth as the cultivation system. Lespedeza plants, although kept low, competed seriously with the peach seedlings. Crotalaria was nearly as detrimental. Mulches were disappointing in their effects.

1521. LATIMER, L. P., AND PERCIVAL, G. P. 634.11-1.875
Sawdust, seaweed and meadow hay as mulch for McIntosh apple trees.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 49-52, bibl. 4.

Two seasons' results showed that young apple trees mulched with hay or seaweed produced more and larger fruit than trees mulched with sawdust or not at all.

1522. MARTIN, J. P., AND WANG, Y. 631.874
Utilization of plant residues for the production of artificial manures.
J. Amer. Soc. Agron., 1944, 36: 373-85, bibl. 20.

Greenhouse and field studies, which are described, demonstrated the production from maize stalks of high-grade artificial manure, comparable to cow manure, within a period of 3 months and from oat and barley straw within 4 to 6 months. The residual effects were much greater than those of an inorganic fertilizer. All the trial composts were reinforced with a certain amount of superphosphate.

1523. VILJOEN, N. 631.875
The preparation and use of compost.
Fmg S. Afr., 1944, 19: 359-65, 370.

The paper is a compilation from articles published in *Farming in South Africa* in the course of the last few years, discussing the requirements for success in the preparation of compost and some methods of making and using it. The necessity for farmers of converting their own waste material into a substitute for the dwindling supplies of kraal manure, in order to maintain soil fertility, is strongly emphasized. The instructions are accompanied by photos.

Cultural practice.

1524. REBOUR, H. 634.1/8-1.542
La taille des arbres fruitiers en Afrique du Nord.
 (Pruning fruit trees in North Africa)
 Office de l'experimentation et de la vulgarisation
 agricoles, Tunis, 1937, pp. 300; and
 A.B.C. du tailleur d'arbres fruitiers. (The
 pruner's A.B.C.)
Bull. Inspect. gén. Agric. algér. 58, 1942, pp. 16.

In his treatise on pruning in 1937 the author deals in detail with the particular pruning of the following fruit species, paying special attention to the first seven named:—peach, pear, olive, vine, orange, mandarin, lemon, apricot, almond, cherry, plum, apple, quince, fig, pomegranate, loquat, and carob. The book is well illustrated.

In the more recent bulletin general principles are set out in skeleton form with diagrams, their application to particular species being left to the reader.

1525. KOBEL, F. 634.1/7-1.542
 Physiologische Grundgesetze und Baumschnitt.
 (Fundamental physiological laws and the pruning
 of trees.)
Schweiz. Z. Obst-u. Weinb., 1944, 53: 180-4.

A discussion of the principles of H. Winkelmann and F. Wenck's book: *Das Schneiden der Obstbäume und Beerensträucher* (The pruning of fruit trees and bushes; E. Ulmer, Stuttgart, Grundlagen u. Fortschr. im Garten-u. Weinb., H.69, pp. 100, RM. 2 [undated]). The article is a reply to the German authors' criticism of the Oeschberg method of building up fruit trees, which is widely used in Switzerland.

1526. McGRATH, J. V. 634.11-1.542
 Pruning Granny Smith apple trees.
Agric. Gaz. N.S.W., 1944, 55: 205-8.

Nine photos and an explanation of the principles in the text show how to develop well-balanced Granny Smith apple trees in New South Wales by pruning, in spite of the somewhat upright growth habit of the variety. A moderately open centre has to be aimed at and up to 30 leaders and sub-leaders may be developed in a vigorous tree.

1527. McGRATH, J. V. 634.11-1.542
 Pruning Democrat apple trees.
Agric. Gaz. N.S.W., 1944, 55: 241-4.

These instructions for the pruning of Democrat apples are supported by nine photos and cover all stages of the tree's development. Since the variety makes little excess growth it is necessary to cut the leaders back fairly severely in a carefully planned manner in order to furnish the limbs with sufficient fruiting wood. A vigorous Democrat tree will carry 20-25 leaders and sub-leaders.

1528. RENAUD, M. 634.37-1.542
 La taille du figuier. (Pruning the fig tree.)
Bull. Inspect. gén. Agric. algér. 55, 1942, pp. 8,
 bibl. 2.

A plea for more rational pruning of figs than has hitherto been carried out in Algeria. The lessons of Californian experience are applied to individual types of fig.

1529. REBOUR, H. 634.63-1.542
 Aide-mémoire du tailleur d'oliviers. (The olive
 pruner's notebook.)
Bull. Inspect. gén. Agric. algér. 42, 1941, pp. 20.

A plea for rational pruning of the olive based on what is wanted from the tree and its condition and shape. Illustrated by diagrams, the advice given is eminently practical.

1530. REBOUR, H. 631.67: 634.1/8
 La conduite de l'irrigation dans les cultures
 fruitières en Algérie. Fasc. 1 et 2. (Irrigation
 practice in Algerian orchards.)
Bull. Inspect. gén. Agric. algér. 72 and 72 bis,
 1942, pp. 80 and 46, bibl. 31.

The author gives a very full account of the latest recommended methods of irrigating Algerian orchards. He

discusses the theory of irrigation, the different systems and their applicability to different conditions, and the varying demands of different fruit species. In the second bulletin he illustrates both theory and practice by the use of diagrams, photos and line drawings. These two publications should be of considerable value to fruitgrowers who want to irrigate their land but are uncertain how to begin, and even more valuable to horticultural advisers faced with the necessity of drawing up schemes of irrigation for fruit-growers. Though written for North African conditions they should have a much wider appeal.

1531. HARDEN, F. B. 631.67: 634.1/8
 The grower unit and irrigation expansion.
J. Dep. Agric. S. Aust., 1944, 47: 504-7.

The paper read at a conference of River Murray Branches of the Agricultural Bureau of South Australia in May 1944 outlines a plan for developing the dry areas of South Australia as deciduous fruit, vine and citrus growing districts by means of irrigation from the Murray Basin.

1532. GAYFORD, G. W. 634.1/7-1.62
 Orchard drainage.
J. Dep. Agric. Vict., 1944, 42: 147-9.

Injury to fruit trees from waterlogging frequently occurs on Victorian soils. It is suggested by the author that sub-surface drainage is the best method of removing surplus water and an illustrated description of its installation is given. Surface drainage and the growing of cover crops in winter are also mentioned as remedies if the first method cannot be afforded.

1533. SWARBRICK, T. 577.15.04: 634/635
 The effect of various concentrations of naphthoxy-
 acetic acid and naphthalene acetic acid in inhibiting
 shoot development in apple, swede, carrot and
 potato.
A.R. Long Ashton agric. hort. Res. Stat. for 1943,
 1944, pp. 25-30, bibl. 2.

Treating both cut-back and unpruned one-year-old shoots of large vigorous Crawley apple trees in mid-April with 1% α -naphthaleneacetic acid and 1% β -naphthoxyacetic in methylated spirits or in lanoline resulted in greatly delayed or completely inhibited shoot growth. Treatment of swede and carrot crowns and potato tubers with the same substances at 0.25, 0.5 and 1.0% concentrations in lanoline and in the case of the potatoes in aqueous solution also resulted in delayed and inhibited growth. The swedes and carrots treated with 1% preparations formed neither shoots nor roots. Dipping proved much easier than smearing.

1534. MAGNESS, J. R., BATJER, L. P., AND BAYNES, W. C. 577.15.04: 634.11: 581.145
 Attempts to influence flower bud initiation in
 apples by chemical growth substances.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
 43: 53-5, bibl. 6.

The painting of secondary or new spur growth on selected spurs of 8-year-old Winesap apples at Beltsville Experiment Station, Md, with melted lanolin containing various growth substances at various concentrations was in all cases ineffective in appreciably modifying the growth condition of the spurs.

1535. PODEŠVA, J. 634.1/7-1.55: 577.15.04
 Durch Hormonisierung zur Erntesteigerung.
 (Increased yields resulting from hormone treat-
 ment.)
Dtsch. Obstb., 1942, H. 4, pp. 61-3, from
 abstract *Forschungsdiend*, 1942, Vol. 14, abstr.
 p. 51.

The spraying of various tree fruits and fruit varieties with weak solutions of heteroauxin or α -naphthylacetic acid partly at the time of flowering (50, 25, 12.5 mg. per litre water) and partly 3-4 weeks later at the time of fruit setting

(10, 5, 2.5 mg./l.) resulted in more fruits being set and in considerably increased yields. The treatments, which affected only some of the more susceptible tree fruits, for instance apricots, were repeated 5 times in favourable weather at intervals of 10-14 days using sufficient spray liquid to wet all leaves on fruiting branches. It is claimed that the treatment has been proved to be a paying proposition for small holders and home gardeners, while its application on a commercial scale requires further investigation. The trials were carried out at the College of Agriculture, Brno, Czechoslovakia.

1536. BATJER, L. P., AND MOON, H. H.

634.11-1.542.27
Thinning apples and peaches with blossom-removal sprays.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 43-6, bibl. 4.

At Beltsville Experiment Station, Md, considerable variability in response to Elgetol (a sodium salt of dinitroresol) blossom-removal sprays was found between different trees of Yellow Transparent and between different parts of trees. There was both in apples and peaches a much greater reduction in fruit set among the lower branches than in the upper portion of the tree, and this is ascribed to a greater susceptibility to injury of flowers on the relatively less vigorous growths. Whether in these circumstances the thinning of trees by spraying as a substitute for hand thinning is feasible in commercial orchards is a matter requiring further examination.

1537. HOFFMAN, M. B., AND VANGELUWE, J. D.

634.11-1.542.27
Some results of thinning certain apple varieties at bloom time with a caustic spray.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 47-50, bibl. 4.

Spraying with Elgetol at blossom-time at Cornell University was more effective with some apple varieties than with others. The results appear to depend on the degree of self-fruitfulness of the variety, on the vigour of the trees, the stage of flower development at the time of spraying, the weather and the concentration of the spray.

1538. SNYDER, J. C.

634.25-1.542.27
Pole or stick thinning saves time in peach orchard.
Bett. Fruit, 1944, 38: 11: 15.

The labour of thinning orchard peach trees has, it is claimed, been reduced to one-eighth by the use of a long pole with which the peaches are knocked off the tree. The pole, 10-14 ft. long, is rounded, with the diameter at the base about 2 inches and at the top 1 inch. The region of the smallest diameter should be 2 to 3 feet from the tip rather than at the tip so that the spring action is in the upper 4 or 5 feet of pole rather than throughout its length. Good action is obtained when the diameter here is reduced to three-quarters of an inch with a gradual taper each way. Pole thinning must be done during the June drop to get the fruits off easily and uniformly. The operator, with the base of the pole grasped firmly, strikes with smart light taps directly into the clumps of fruit or against the side of small branches needing thinning. The fruit will not be injured. The speed attained is ten times that of hand thinning. Actually regular spacing is not particularly important. It is more important to leave the desired total number of fruits on the tree than to space those which are left to any specified distance. Fruit on trees with barren branches may be left thick on loaded branches to make up the desired total amount for the tree.

1539. SNYDER, J. C.

634.1/7-1.55
Most fruit weight added in last few days on tree.
Bett. Fruit, 1944, 38: 12: 15-6.

A study carried out in 1942 at the Tree Fruit Branch Experiment Station at Wenatchee revealed the following weight

increase percentages of fruit on the tree between the shipping and canning stages. Cherries, 12 days; Napoleon (Royal Anne), diameter increase 7.1%, weight increase 22.8%; Bing, 7.1% d., 18.9% w. Apricot, 8 days; Moorpark, 5.9% circumference, 16% w., 35% soluble solids. Peaches, Elberta 13 days; 12% c., 35% w., 30% s.s.; Hale 14 days; 14.3% c., 42.6% w., 22.7% s.s. The weight increase of fruit on a large Napoleon cherry with a medium crop was about one-fourth that of a medium sized tree with a light crop. At the shipping stage the fruit was larger on the tree with the medium crop. A number of pressure test readings for the two stages are recorded.

1540. VYVYAN, M. C.

577.15.04: 634.11-1.55
Further trials with sprays to control pre-harvest fruit drop.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 49-51.

In 1943, an early season, a spray of naphthaleneacetic acid at a concentration of 10 p.p.m. and at about 5 gallons per tree was applied to mature Worcester Pearmain apple trees on 17 August, 5 days after the start of picking for this variety. Drop was considerably reduced during the 3-week picking period and it was possible to extend it 4 days. Out of a crop of 5 bushels per tree the sprayed trees lost less than half a bushel by dropping, the unsprayed trees nearly two bushels in the three weeks.

1541. SOUTHWICK, L.

577.15.04: 634.11-1.55
Further results with sprays and dusts in controlling the preharvest drop of apples.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 109-10, bibl. 4.

Work in New York and Massachusetts indicates success in checking pre-harvest drop with both regular strength dusts (1 lb. dust=10 gal. of a standard .001% spray in amount of active ingredients) and with double strength dusts. Double strength dusts or two applications of the regular strength dusts proved the most effective. [The precise substances used are not named, but it is noted that commercial hormone sprays were used for comparison.]

1542. CHRISTOPHER, E. P., AND PIENIAZEK, S. A.

577.15.04: 634.11-1.55
A further evaluation of hormone sprays.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 51-2, bibl. 6.

Results of tests in 1942 at the Rhode Island Experiment Station indicate that spraying with naphthaleneacetic acid or retention of the fruit on the tree by means of adhesive tape will result in an increase in fruit size sufficient to offset the moderate fruit drop sustained during treatment, and will give rise to improved colour, eating quality and decreased brown core development in McIntosh apples held on the tree longer by these methods. There was no loss in storage quality of the fruit in question.

1543. NATIONAL SHADE TREE CONFERENCE AND NATIONAL ARBORIST ASSOCIATION.

631.536: 635.97
Transplanting of trees and shrubs in the North-eastern and North Central United States.
Combined Proc. 19th nat. Shade Tree Conf. and 10th Western Shade Tree Conf., 1944, pp. 70-146.

This extremely practical article was prepared for the U.S. Army Camouflage Branch Engineer Board. The whole process of moving big and small trees is considered in great detail and with very clear, explanatory illustrations. Directions and hints are given under the following main headings: selection of plants, season for transplanting, digging operations—which vary of course with size of plant and include wrapping—, loading and transporting, replanting—this section including all necessary technical detail on soil preparation, manuring, pruning, mulching, staking and maintenance after planting.

1544. MCGILLIVRAY, K. D. 634.63-1.56

Harvesting and packing pickling olives.

Agric. Gaz. N.S.W., 1944, 55: 150.

The grading of pickling olives to size and colour for the Sydney market is recommended.

1545. BARNETT, R. J., AND FILINGER, G. A. 634.1/2-1.542
(11)

Pruning fruit trees in Kansas.

Circ. Kans agric. Exp. Stat. 218, 1944, pp. 24.

BLACK, W. E. 658.8: 634.11+634.31

Consumer demand for apples and oranges.

Bull. Cornell agric. Exp. Stat. 800, 1943, pp. 44.

BOYNTON, D., CAIN, J. C., AND COMPTON, O. C. 634.11: 581.192

Soil and seasonal influences on the chemical composition of McIntosh apple leaves in New York.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 15-24, bibl. 8.

COWART, F. F., AND SAVAGE, E. F. 634.25-1.874

The effectiveness of some cover crops for controlling erosion and runoff in a peach orchard.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 53-6, bibl. 3.

HOFFMAN, M. B., AND VANGELUWE, J. D. 634.11-1.542.14

Some results of thinning early McIntosh and Golden Delicious apples at blossom time with a caustic spray [Elgetol].

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 116-8, bibl. 3.

- KIPER, N. Ö. 634.13

A description of 19 varieties of pear grown in Central Anatolia. [Turkish.]

Sayı Ankara Yüksek Ziraat Enstitüsü 123, 1941, pp. 98, bibl. 30.

LATHROP, F. H., PLUMMER, B. E., AND DIRKS, C. O. 634.11: 581.45

A simplified method of sampling known areas of apple leaves for chemical analysis.

J. econ. Ent., 1944, 37: 294-5, bibl. 1.

Illustrations help considerably in explaining the method.

NICHOLSON, V. H. 658.8: 634/635(747)

Regional markets in New York State.

Bull. Cornell agric. Exp. Stat. 801, 1943, pp. 48.

TUKEY, H. B., AND BRASE, K. D. 634.11-1.541.11

An uncongeniality of the McIntosh apple when top-worked onto Virginia crab.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 139-42, bibl. 10.

WELLINGTON, R., AND HOWE, G. H. 634.11-1.523

The performance of seedlings derived from selfing and crossing the McIntosh apple.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 273-9.

YEAGER, A. F. 631.541: 581.4

Xylem formation from ring grafts.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 221-2, bibl. 4.

SMALL FRUITS, VINES AND NUTS.

1546. HARRIS, R. V. 634.711

Norfolk Giant; a reliable raspberry for the present day.*

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 108-10, *Fruitgrower*, 1944, 98: 81-2, 98, and *Market Gr.*, 1944, 22: 31: 6-8, 32: 16-7.

The raspberry, Norfolk Giant, is recommended to replace the current degenerate stocks of Lloyd George and other varieties. Norfolk Giant has a marked degree of natural resistance to infection by the mosaic disease, but should it become infected either by the mosaic or leaf curl viruses it quickly develops a distinct range of easily recognizable leaf symptoms, later coupled with a dwarfed and degenerate appearance. Thus, diseased stools, unlike those of less expressive varieties can be found and eliminated by field inspection alone. Growers are urged to take advantage of the recent offer of the Ministry of Agriculture to inspect their stocks of Norfolk Giant (no other variety) in respect of purity and freedom from disease. By so doing they will ensure that their stock remains clean and that they can plant up new areas from it without risk. A note is given on the treatment of mosaic-infected stock. The symptoms appear in June and reach their peak in September and early October. The symptoms are not noticeable when canes are actively growing in moderate summer and autumn temperatures. The symptoms are somewhat masked by direct sunlight or moisture on the leaves. Infected stools should be at once removed with all roots and suckers and destroyed. Roguing may be done in July and again in September. As an extra precaution the two stools on either side of an infected stool should also be removed. It is impossible to rogue 2-year-old plantations when the incidence exceeds 1 in 20 stools. In such cases the mosaic stools should be marked and new stock propagated from selected canes well removed from the diseased stools. It is useless to replant on a site which has previously held infected plants.

* N.B.—Titles differ in the three journals, but subject matter is practically the same.

1547. JOHNSTON, S. 634.73-1.541.5

Investigations in budding the highbush blueberry.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 301-2.

Budding is used in breeding and selection of blueberries. Hints on technique are given.

1548. DOEHLERT, C. A. 634.73-1.8

Fertilizing commercial blueberry fields in New Jersey.

Circ. N.J. agric. Exp. Stat. 483, 1944, pp. 8.

Adequate manuring is very necessary in the case of the blueberry, particularly at the start of the growing season. A good general rule is to apply a total of 600 lb. of 7-7-7 fertilizer per acre per season to bushes strong enough to bear 2 quarts per season and up to 800 lb. per acre to those ready to bear 3 quarts. Two-year-old bushes not yielding 2-4 quarts indicate something wrong with the cultivation methods. The fertilizer is best applied in two doses, in April and again in June. Excess fertilizer causes an increase in the normally small amount of late soft growth which bears loose fruit buds and a reduction in the number of fruit buds formed. Insufficient fertilizer is evidenced by a yellowish tinge in the foliage and by an increase in the number of short laterals, though other unfavourable conditions of soil moisture, or pruning may also cause these symptoms. It is mentioned that the 7-7-7 fertilizer carries more available P than is believed to be necessary and that under peacetime conditions a very good blueberry fertilizer can be made as follows: 300 lb. nitrate of soda, 300 lb. calcium nitrate, 650 lb. tankage (7% nitrogen), 450 lb. rock phosphate, 300 lb. sulphate of potash.

1549. JOHNSTON, S. 634.73-1.8

The influence of manure on the yield and size of fruit of the highbush blueberry.

Quart. Bull. Mich. agric. Exp. Stat., 1943, 25: 374-6, bibl. 1.

An old statement that highbush blueberry would not thrive

on a heavily manured soil was re-investigated at the South Haven Experiment Station. The conclusion reached from the experimental results is that a liberal application of horse and cow manure is not harmful to the plant, though in this particular instance no benefit was derived from the treatment. The lack of response is thought to be due to the abundance of organic matter already present in the soil.

1550. BAILEY, J. S. 634.73-1.8
A comparison of manures applied to cultivated blueberries.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 299-300, bibl. 4.

Cow, horse and poultry manure all gave good results with blueberries.

1551. CHANDLER, F. B., AND MASON, I. C. 634.73-1.542

Pruning of low-bush blueberries.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 173-4, bibl. 1.

Low-bush blueberry (*Vaccinium angustifolium*) is best pruned by burning.

1552. ROGERS, W. S., AND BUTTFIELD, J. M. 634.75-1.533

The production of healthy strawberry runners.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 87-94, bibl. 7.

The authors discuss reasonable methods for the production of healthy strawberry runners, paying special attention to the avoidance of virus. They recommend that runner raising should be carried out in areas well away from the main strawberry areas. They insist that only virus-tested stocks should be used and that cultivation should be done on isolated blocks. Virus-sensitive and virus-tolerant varieties should not be raised at the same place. All manner of practical points are made on every detail of cultivation.

1553. SWARBRICK, T. 634.75: 577.15.04

Progress report on the use of naphthoxyacetic acid to increase the fruit set of the strawberry variety Tardive de Leopold.

A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 31-2.

Naphthoxyacetic acid in water at 20 p.p.m. was applied as a drenching spray from a knapsack sprayer on 26 May, 1943, to Tardive strawberries in full flower grown in alternate strips with Sovereign, the Sovereign blossom being nearly over at that date. A difference in yield of 940 lb. per acre was established in favour of the treated as against the untreated plots, the significant difference required by analysis of variance method being only 750 lb. Increase in size of fruit was largely responsible for the increased yield. The work is being continued with other substances.

1554. CLARK, J. H. 634.75-1.84-1.415

Growth and composition of the strawberry plant as affected by source of nitrogen and pH value of the nutrient medium.

Bull. N.J. agric. Exp. Stat. 691, 1941, pp. 48, bibl. 54.

The response of the Howard 17 strawberry grown in sand culture to 21 nutrient solutions of the Type I triangle series was tested at the New Jersey agricultural Experiment Station. In respect of all quantitative measurements R1S5 (volume-molecular concentrations: 0.0022 KH_2PO_4 , 0.0108 $\text{Ca}(\text{NO}_3)_2$ and 0.0043 MgSO_4) proved superior to all other solutions. It was found that a KH_2PO_4 concentration of more than one-eighth of the total salts was deleterious. When nitrate and ammonium sulphate were compared as sources of nitrogen no difference occurred in top growth measured by dry weight, but root growth in the ammonium

culture was inferior. 4.6 and 6.4 respectively were the optimum pH values in the nitrate and ammonium series. While again there was no difference in reducing sugar and starch content of the crowns independent of the pH value of the solutions, roots from the nitrate series were considerably richer in reducing sugars and starch than those from the ammonium series. In two acid soils application of lime was found to be beneficial, the most favourable pH value in the case of the soil experiments being 5.2 and 6.4. It would therefore appear that strawberries are neither injured by applications of lime nor are they adapted to extremely acid soils. The pH values of different cell layers are given.

1555. COLLISON, R. C. 634.75-1.8

Fertilizer experiments with strawberries in Oswego County, New York.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 295-8.

Neither phosphorus nor potassium appeared to offer any benefit to strawberries under the conditions of the experiment. Nitrogen in the form of commercial fertilizer without manure gave very good yields. If manure is used it should be well rotted or incorporated well in advance of strawberry setting.

1556. MARTIN, R. H. 634.8

The romance of Australian viticulture.

J. Dep. Agric. S. Aust., 1944, 47: 384-7.

A survey, given in a broadcast, of the development of the vine-growing industry, which now occupies an important place in Australian primary production.

1557. AKMAN, A. 634.8+663.2

A review of vine growing in Central Anatolia with special reference to the district round Ankara. [Turkish and German.]

Sayı Ankara Yüksek Ziraat Enstitüsü 116, 1941, pp. 63+50.

A brief survey of viticulture in the neighbourhood of Ankara is followed by an account of the wine made and its analysis. Only about 1% of the grapes produced are made into wine. The varieties used for it are named and described.

1558. STELLWAAG, F. 634.8-2.6/7

Verbesserung der Wirtschaftsform im Weinbau.

[Improving cultivation methods in viticulture.]

Forschungsdienst, 1944, 17: 84-8, bibl. 14.

In the plant pathologist's opinion viticulture in Central Europe would benefit from planting vines at wider distances so as to expose the eggs of the pests *Conchylis ambiguella* and *Polychrosis botrana* and the spores of *Peronospora* to unfavourable conditions.

1559. HARMON, F. N., AND SNYDER, E. 634.851-1.542.27

Effect of cluster removal upon fruit of *vinifera* grapes.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 309-11, bibl. 1.

Reducing the number of clusters per vine in 8 varieties including Sultanina, Malaga and Ohanez resulted in earlier ripening but in only very small or no increase in berry weight, so that total yield was reduced. Some light cluster thinning appears advisable in California to maintain adequate vigour for proper fruiting in subsequent years.

1560. GOLE, H. V. 634.8-1.542

The bearing of grape vines.

Ind. Fmg, 1943, 4: 617-9.

As grape vines in the Bombay province are now weakened by bearing heavy crops, a method of conscientious pruning is demanded which will not produce excessively high yields at the cost of quality. Pruning is carried out twice, in October and April.

1561. SMITH, M. B., AND OLMO, H. P. 634.8: 581.192
The pantophenic acid and riboflavin in the fresh
juice of diploid and tetraploid grapes.
Amer. J. Bot., 1944, 31: 240-1, bibl. 3.
The pantophenic acid and riboflavin content in the fresh
juice of grapes of the original diploid varieties and the
derived autotetraploid varieties are reported. No significant
differences were found between the vitamin content of the
diploids as compared with the tetraploids. However,
significant differences in the pantophenic acid content
appear between varieties, with a higher average content of
this vitamin occurring in the juice of interspecific hybrids
of *labrusca* × *vinifera* parentage than in European varieties
derived from the species *vinifera*. [Authors' summary.]
The investigation was carried out at the University of
California, Davis.
1562. SCHUSTER, C. E. 634.51: 581.13: 631.55
Vegetative growth on Persian walnut trees
associated with nut production.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 85-8.
Relative growth: nut ratios over a short period for Fran-
quette and Parisienne varieties of walnut.
1563. ZARGER, T. G. 634.51-1.875
Beneficial influence of mulches on two years'
growth of planted black walnut varieties.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 5-6.
Mulching experiments carried out by the Tennessee Valley
Authority resulted in benefit from mulching with straw,
broomsedge or well-rotted pine sawdust. The two last
stimulated height growth notably in the second year.
1564. GOSSARD, A. C. 634.521-1.535: 577.15.04
The rooting of pecan softwood cuttings under
continuous mist.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 251-4, bibl. 6.
This is a progress report of the use of growth substances and
vitamin B₁ for the rooting of pecan cuttings in a small-scale
trial at Meridian, Mississippi.
1565. SMITH, C. L. 634.521-1.55: 577.15.04
Effects of some growth chemicals on premature
dropping and development of pecan nuts.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 119-22, bibl. 9.
Treating newly formed pecan nuts with α -naphthaleneacet-
amide and indole-3-butyric acid produced no significant
effect. Treatment with α -naphthaleneacetic acid resulted in
increased nut fall. Reasons for this are discussed.
1566. SITTON, B. G. 634.521
Specific gravity as a criterion of filling in the
pecan nut.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 89-93, bibl. 3.
Quality and flavour of kernels were found to be directly
correlated with specific gravity of nut, the higher the S.G.
the better being the quality.
1567. BECKWITH, C. S. 634.76
(8) Late holding of water on cranberry bogs.
Circ. N.J. agric. Exp. Stat. 402, 1940, pp. 4.
CHILDS, W. H. 634.711.2-1.542
The influence of promptness of topping black
raspberries on growth and productiveness of
canes.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 280-2, bibl. 1.
Influence favourable.
DARROW, G. M., AND CLARK, J. H. 634.711
The Sunrise red raspberry.
Circ. N.J. agric. Exp. Stat. 397, 1939, pp. 4.
KEMMER, E.
Zur Lösung des Problems der Walnussveredlung
in Deutschland. (The solution of the walnut
grafting problem in Germany.)
Dtsch. Obstb., 1942, H.1, p. 11.
From abstract *Forschungsdienst*, 1942, Vol. 14,
abstr. p. 51.
ROMBERG, L. D. 634.521: 581.14
Some characteristics of the juvenile and the
bearing pecan tree.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 255-9, bibl. 1.
SCHNEIDERS, E. 634.51-1.541
Zur Geschichte der Walnussveredlung. (The
history of walnut grafting.)
Sortenkunde im Obstbau, being Beil. Dtsch. Obstb., 1941, H. 9, 10, 11, 12.
SLATE, G. L., AND SUIT, R. F. 634.711-1.523
A second report on the breeding of autumn-
fruiting red raspberries.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 283-8, bibl. 2.
WALDO, G. F. 634.75-1.67
Effects of irrigation and plant spacing upon
runner production and fruit yield of the Corvallis
strawberry.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 289-94, bibl. 9.

PLANT PROTECTION OF DECIDUOUS FRUITS.

1568. CZINK. 634.21-2.19
Untersuchungen der Marillenkulturen im Kreise
Nikolsburg. Ein Beitrag zur Frage des vorzeiti-
gen Marillensterbens. (Investigations on apri-
cots in the Nikolsburg district. A contribution
to the problem of premature death in apricots.)
Gartenbauwiss., 1942, 16: 490-508, from abstract
Forschungsdienst, 1942, Vol. 14, abstr. p. 50.
Observations are recorded on the relation between health of
apricot trees and such factors as rootstock, climate, soil and
nutritional conditions. The survey was conducted by
students of the horticultural research station at Eisgrub
and extended over 690 orchards in the Nikolsburg district
of Czechoslovakia.
1569. THOMPSON, S. G. 632.19: 634.1/7
A review of our knowledge of mineral deficiencies
in fruit trees.
A.R. East Malling Res. Stat. for 1944, A27,
1944, pp. 103-6.
Many cases of poor performance by fruit trees, at one time
inexplicable, are now known to be due to deficiency of trace
elements. Such deficiencies can be diagnosed and treated
successfully. Minerals, the deficiency of which can definitely
be of importance in England, are iron, manganese and
magnesium. The symptoms and treatment of these are
briefly discussed. It is noted that, although a trace element
may be present in the soil in amount sufficient for normal
growth, there may still be a deficiency, either because it is
in a form the plant cannot absorb or because the element
becomes unavailable actually in the plant itself. Excesses
of lime, phosphate or potash are frequent causes of defi-
ciencies of trace elements.
1570. ROACH, W. A. 632.19: 634.1/7
The present position regarding the diagnosis of
mineral deficiencies in fruit trees by plant
analysis and plant injection.
A.R. East Malling Res. Stat. for 1943, A27,
1944, pp. 99-103.
The author discusses analytical methods of diagnosing
mineral deficiencies, particularly spectrographic analysis

and injection methods, briefly describing interveinal, leaf-stalk, branch and whole tree injection. He notes that complete diagnosis cannot be made on the basis of analysis only and that injection is a way of supplementing and elucidating evidence thus obtained. He cites several instances of success in different parts of the world obtained by curative treatment based on diagnosis made by a combination of the two methods.

1571. LINDNER, R. C., AND HARLEY, C. P. 632.191: 634.1

Nutrient interrelations in lime-induced chlorosis. *Plant Physiol.*, 1944, 19: 420-39, bibl. 33.

In this paper from the Bureau of Plant Industry, U.S. Department of Agriculture, Wenatchee, Wash., are discussed some of the complex nutrient interrelations of lime-induced chlorosis and their effect on the iron metabolism of certain plants, including apple and pear. Leaves affected with lime-induced chlorosis are high in potassium but somewhat low in calcium and magnesium, though whether as a cause or a result of chlorosis has not been established. Data are presented showing the distribution of various elements in various fractions of green and chlorotic leaves. Over half the iron in the leaves was present in a form insoluble in 1 N HCl. Neither the total iron, the insoluble iron, iron soluble in various agents or electro-dialysable iron could be correlated with lime-induced chlorosis. The data suggest that a relatively high potassium level induces chlorosis by replacing the iron on the enzyme responsible for chlorophyll formation, thereby inactivating the enzyme. A complex of causes, whose interrelations are not yet established, are involved in lime-induced chlorosis.

1572. THOMPSON, S. G. 634.23-2.19: 546.27
Abnormal ripening of cherries.
A.R. East Malling Res. Stat. for 1943, A27, 1944, p. 51.

The fruit of a large and apparently healthy Caroon cherry tree growing near East Malling became hard, shrivelled and blotchy just before maturity in 1943. Leaf analysis showed abnormally low boron content. The soil of half the area of the overhang of the branches was given a dressing of $1\frac{1}{2}$ lb. commercial borax in March 1944. There was drought in May and June. At the end of June the symptoms re-appeared but less severely than in 1943. Moreover on the treated side of the tree cherries ripened earlier and only 20% showed abnormality as against 80% on the untreated side.

1573. LATIMER, L. P., AND PERCIVAL, G. P. 634.11-2.19: 546.27
How much borax can an apple tree tolerate?
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 21-4, bibl. 4.

Trials carried out at the Agricultural Experiment Station, Durham, N. Hampshire, indicate that it depends upon the pH of the soil. Even light dressings of borax applied to acid soils proved toxic to the trees. Heavier applications of borax proved less toxic after the pH had been raised to 7.1 by the addition of calcium cyanamide.

1574. SOUTHWICK, L., AND SHAW, J. K. 634.11-2.19: 631.811.6
Some results in correcting magnesium deficiency in apple orchards.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 8-14.

Results of treatment judged by foliage scorch and dry leaf content 1 year after treatment showed that 4 early season sprays of 2% magnesium sulphate on young apple trees of several varieties gave commercial control. Soil applications of Epsom salts, magnesium oxide and kieserite benefited young mulched trees the following year but not older bearing trees in sod. The broadcasting of magnesium limestone up to 50 lb. per tree was ineffective.

1575. ANON. 634.1/7-2.19: 546.47

Zinc deficiency of fruit trees.

Agric. Gaz. N.S.W., 1944, 55: 290-2.

Zinc deficiency symptoms in citrus, grapes and deciduous fruit trees, as they occur in New South Wales, and their control by spraying are described and illustrated by photos.

1576. KEMP, H. K., AND BEARE, J. A. 634.1/8-2.19: 546.47
Little leaf in deciduous fruit trees and vines.

J. Dep. Agric. S. Aust., 1944, 47: 470-9, bibl. 7.

The widespread distribution of this zinc deficiency trouble and its symptoms are described in detail. The main symptoms are a marked reduction of leaf size and a stag-headed top if neglected. The most conspicuous symptom with peaches, nectarines and apricots is severe chlorosis of the affected tree portions accompanied by a number of minor but distinct features, whilst almonds exhibit stunted growth as the most prominent characteristic. The order of susceptibility to little leaf seems to be apple, peach and nectarine, apricot and pear, citrus being apparently less susceptible than pome or stone fruit. Chlorosis is also the most marked little leaf symptom of vines, of which the Muscat Gordo Blanco, Pedro Ximenes and the Zante currant appear to be the most severely affected varieties, sultanas being the least susceptible of those grown on the River Murray. In all cases the response to zinc treatment was excellent. As zinc oxide, which may be applied as a foliage spray, was successful only with apples, zinc sulphate, applied as a dormant spray, was used with the other tree fruits. Repeated treatment is necessary in most cases. With apricots an additional application to butt or main limbs of 6 zinc nails per inch of circumference in 6 rows proved necessary for success. The following concentrations of zinc sulphate are recommended: Peaches: 30-50 lb. per 100 gal. for the first two years. Thereafter the treatment may be omitted in some seasons or reduced in strength. Apricots: 30 lb. per 100 gal. annually. Pears: 50 lb. per 100 gal. Apples: 50 lb. per 100 gal. or a foliage spray with zinc oxide, 3 lb. per 100 gal. The best treatment for vines was to swab them immediately after pruning with zinc sulphate at a concentration of 2 lb. per gal. This treatment also increased the yield of many vines in which the only deficiency symptom was poor yield. Little leaf symptoms are illustrated.

1577. SHEAR, G. M., AND WINGARD, S. A. 631.8: 632.3/8
Some ways by which nutrition may affect severity of disease in plants.
Phytopathology, 1944, 34: 603-5, bibl. 8, being *Sci. Pap. Va agric. Exp. Stat.* 120.

A brief survey of a number of papers on the effect of host nutrition upon the severity of disease and of the theories propounded therein.

1578. GREEN, D. E. 634.1/7-2.11
Weather injuries to fruit.
J. roy. hort. Soc., 1944, 69: 175-8.

The typical symptoms of certain weather injuries to fruit, chiefly in England, are described. *Frost damage to bark.* Injury takes the form of longitudinal splitting of the bark. In severe cases the loose edges should be nailed down with broad-headed tacks and the wound protected by straw bands or sacking. When the sacks are removed later, the edges of the crack which have not adhered to the bark should be trimmed until only clean bark is seen along the edges of the crack, and the wound should be painted with a protective paint. *Frost damage to flowers.* Peaches, plums and cherries having flowers unprotected by leaves are more sensitive to frost than apple flower clusters well shielded by their foliage. In apples the whole flower or the pistil only may be killed and setting fruits are also very sensitive. There are varietal degrees of susceptibility in apples (see Potter's list, *Agriculture*, 1942, 49: 60-1, *H.A.*, 12: 845). Frost damage to strawberry flowers is shown by the

blackened eye. *Frost damage to apple fruits.* Often there are few signs of external injury, but, if cut across, the interior of the young fruit will be seen to be brown or black. These fruits either fall off or remain misshapen. In larger fruit the injury is exterior and takes the form of a band of brown, roughened skin around the middle of the fruit or of russet patches at stalk or eye. *Sun scald* (see also H.A., 13:92 and 1243). On peaches a slightly sunken, discoloured area on the skin which may lift away from the flesh. On apples a similar sunken, discoloured area without skin rupture. The flesh below discolours and dries up. Sometimes, but not always, the fruit will rot. On plums at Wisley sun scald took the form of discoloured patches on the green skin. *Hail injury.* Even slight injury in apples remains in the form of sunken spots. Plums at Wisley were less affected than apples in a severe storm, possibly because they presented a small surface and the hail could only strike them at an angle. In apples a wide corky layer often forms a wide arc in the tissues well below the surface, and this bars off fungal infection.

1579. POMERLEAU, R. 635.97: 632.1
Observations sur quelques maladies non parasitaires des arbres dans le Québec. (Notes on some non-parasitic diseases of trees in Quebec.) *Canad. J. Res.*, 1944, 22, Sec. C, pp. 171-89, bibl. 27.

The discussion, which is well illustrated, concerns damage to trees in Quebec Province, from cold, heat, fumes, dust and other unfavourable environment.

1580. THOMPSON, A. R. 632.14: 635.977
Lightning struck tree survey.
Combined Proc. 19th nat. Shade Tree Conf. and 10th Western Shade Tree Conf., 1944, pp. 34-42.

A survey of the information contained in 370 reports received over a period of 7 years of the effect of lightning on different trees in different parts of the U.S.A. The susceptibility of species and genera, the relationship of struck trees to trees close at hand, the character of injury and remarkable phenomena in particular instances are all discussed.

1581. BARNETT, R. J. 632.111: 634.1/7
Effect of ground cover on the freezing and thawing of orchard soils.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 57-65, bibl. 7.

The effect of snow cover and of covers consisting of rye and straw mulch on the penetration of frost was shown to be great by experiments in an open soil in Kansas. An investigation into the effects of the heaving of soils—due to alternate freezing and thawing—on the roots of fruit trees is being continued.

1582. BLEES, M. 634.8-2.111
Noch einiges zu den Winterfrostschäden 1939/40. (Some further remarks on the frost damage to vines during the winter 1939/40.)
Dtsch. Weinb., 1941, H. 5, pp. 69-72, from abstract *Forschungsdienst*, 1942, Vol. 14, abstr. p. 52.

Several factors are discussed which increased the susceptibility of vines to frost and thus the severity of the injury during the winter 1939/40. The variety Riesling, maturing its wood early and well, suffered least damage.

1583. RUDORF, W., SCHMIDT, M., AND ROMBACH, R. 634.1/7-2.111
Ergebnisse einer Erhebung über die im Winter 1939/40 an Obstgehölzen im Grossdeutschen Reich aufgetretenen Frostschäden. (Results of a survey of frost injuries sustained by fruit trees in Greater Germany during the winter 1939/40.)
Gartenbauwiss., 1942, 16: 550-708, from abstract *Forschungsdienst*, 1942, Vol. 14, abstr. p. 43.

The survey was conducted by a large number of institutes, colleges, etc., all over the country under the direction of the

Kaiser Wilhelm Institut für Züchtungsforschung, Münchenberg. Special attention is given to recordings which compare the frost resistance of different scion varieties and rootstocks.

1584. KEMMER, E. 634.11-1.541.11-2.111
Über die Regenerationsfähigkeit der Obstgehölzwurzeln. (The regeneration capacity of tree fruit roots.)
Gartenbauwiss., 1944, 18: 101-17.

The effect of frost injury to roots of apple trees, which had just completed the nursery stage, was studied at the pomological institute of Berlin in November/December 1942. The frost damage was sustained during the preceding winter and the results are summarized by the author as follows:

- (1) The vigour exhibited by individual trees in the past did not affect the extent of the frost damage. Whether trees were weak or vigorous some were unaffected, others were injured in varying degree.
- (2) Although the roots of EM. XVI, XI and V showed no visible damage, the frost did have a certain effect. With EM. V the development of the crown was unsatisfactory. The trees on the other rootstocks set flower in the following year in spite of vigorous shoot growth, a feature which was also noticeable in the frost-damaged bush trees.
- (3) EM. I, IV, IX and the seedling exhibited medium to severe root damage. EM. II suffered most.
- (4) The best root regeneration occurred in EM. IV, the worst in EM. II. In general, the regeneration of the crown corresponded with the behaviour of the roots.
- (5) On the average of all the combinations in each case there was much less difference in the percentage of total loss sustained by the different varieties (18%) than there was in the percentage of total loss sustained by the different rootstocks (52%). Whereas rootstock losses in the category of "old rooters" with "normal" shoot growth showed a variability of 82%, the varietal variability of "old rooters" was limited to 32%.
- (6) Nevertheless, varietal differences were observed. In this connexion the failure of the usually frost resistant Klarapfel was remarkable. The varieties Victoria and J. Grieve did not produce any "new rooters" with "considerable" shoot growth, and shoot formation in the variety Oldenburg was comparatively light. Allington and Cox, on the contrary, proved frost resistant and showed a good regeneration capacity.
- (7) Those "new rooters" which had been replanted in the nursery, developed better than was anticipated. None of the trees died and the majority were ready for sale in autumn 1943.
- (8) There was no relation between the scion variety and the angle formed by the root with the axis of the stem. On the one hand, rootstocks retained their character independent of the variety in any given combination, on the other, angles in a uniform stand were found to differ.

1585. BRADFORD, F. C. 634.11-2.111
The relationship of late blossoming to frost injury in the apple.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 35-8, bibl. 10.

Studies made by the U.S. Department of Agriculture, Glenn Dale, Md, appear to warrant: "(a) some assumption of sustained frost survival accompanying late blossoming; (b) some caution against too complete reliance on this assumption in selecting parents for breeding; and (c) care in acceptance of records from a single frost for variety evaluation, unless the frost is comprehensive in its scope".

1586. BLUMER, S. 634.11-2.111+2.112
Schädigungen durch Frost und Trockenheit an Apfelbäumen. (Frost and drought injuries to apple trees.)
Schweiz. Z. Obst- u. Weinb., 1944, 53: 245-9.

- (1) *Frost damage.* In some districts of the Swiss cantons * Kemmer describes (1) old rooters (Altwurzler) as combinations in which partial loss of the existing roots has occurred and new growth appears from the more or less damaged roots, (2) new rooters (Neuwurzler) as combinations in which new roots are regenerated from the stem of the rootstock following complete destruction of all existing old roots.

Freiburg and Bern a strange disorder of apple trees was observed in May 1944; a number of branches or whole limbs either failed to make any growth or they developed abnormally small, yellow leaves. In some cases the symptoms were confined to the top leaders or branches on the outside, while the rest of the crown appeared to be quite normal. It is thought that the disorder was caused by frost damage to shallow roots which had started to grow in a warm spell in January.

(2) *Drought spots or spot necrosis* in young apples, destroying up to 80% of the crop of affected trees, were reported from different parts of Switzerland in the second half of June 1944. The symptoms were found to agree with American descriptions of the trouble, which occurs more frequently in the U.S.A. Adopting the explanation of American workers that the spots are caused by interruptions of the water supply, the author suggests that the drought prevailing in May was responsible for the disorder.

1587. MEADER, E. M., AND BLAKE, M. A. 634.25: 581.145: 632.111
Seasonal trend of fruit-bud hardiness in peaches.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 91-8, bibl. 9.

At the New Jersey Experiment Station the maximum resistance of peach fruit buds to cold coincided with the lowest minima recorded for the winter. The seasonal trend of fruit bud hardiness as determined by artificial freezing tests on 11 dates tended to be related inversely to the maximum and minimum temperatures. Hardiness changes in peach fruit buds (and other plants) occur within a rather short space of time.

1588. GUSTAFSON, F. G. 632.184
Is natural gas injurious to flowering plants?
Plant Physiol., 1944, 19: 551-8, bibl. 9.

The effect on flowers of natural gas, i.e. gas obtained from the ground and now piped to many cities in Michigan for domestic use, has been studied at Michigan University. This gas is composed of 74.6% methane, 14.2% ethane, 10.9% nitrogen, 0.2% oxygen and 0.1% carbon dioxide. In coal gas the injury to plants is caused by the ethylene and carbon monoxide, neither of which are present in natural gas. None of the many plants tested at concentrations of 1% were adversely affected. This concentration is very much higher than those found in homes or greenhouses, which in fact were too small to be measurable.

1589. BALKS, R., AND WEHRMANN-EBSTORF, O. 632.184
Schädigungen der Kulturpflanzen durch Grubengas? (Are cultivated plants injured by pit gases?)
Forschungsdienst, 1944, 17: 133-8.

Patches of unhealthy plants of varying size in fields of certain districts especially, in the neighbourhood of mines, in Germany and elsewhere were found to be caused by severe oxygen deficiency in the soil due to the emanation of methane from underground strata.

1590. PALMER, R. C. 634.11-2.19
The influence of amount of crop and harvesting maturity on bitter-pit in Okanagan-grown Newtown apples.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 63-8, bibl. 1.

At Summerland Experiment Station, British Columbia, losses from bitter-pit in Newtown apples could be materially reduced by picking at the proper stage of maturity (iodine tested), but if the tree carried a light crop, say less than one-third of normal, bitter-pit would develop regardless of the time of picking. It is important, therefore, that fruit from normal and light cropping trees should not be mixed, as is done in packing house grading. Colour grading is not a suitable way of separating the heavy from the light crop apples in the packing house, nor is fruit shape; the logical

place for separation is in the orchard. If possible, the light crop trees should be left unpicked until the heavy crop is gathered. The few days of extra ripening on the tree may reduce the incidence of bitter-pit.

1591. BERKELEY, G. H., AND CHAMBERLAIN, G. C. 634.711-2.1+2.3/4+2.8
Diseases of the raspberry.
Publ. Dep. Agric. Canada 760, 1944, pp. 12,
being *Fmrs' Bull.* 123.

It is believed that the raspberry production of Canada, which is given as nearly 9,500,000 quarts in 1942, could be greatly increased, if disease control measures were improved. The bulletin therefore sets out to present the information on raspberry virus and fungous diseases and on non-parasitic troubles, and their control. The addition of three well-printed plates will facilitate the identification of symptoms.

1592. HILDEBRAND, E. M. 634.2-2.8
Virus diseases and the stone fruit industry.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 124-8, bibl. 13.

The present status of the stone fruit virus situation in N. America is discussed. (a) At present it is impossible to obtain certified disease-free plants, for methods of identifying and distinguishing many of the stone fruit virus diseases are lacking. (b) Certified disease-free rootstocks are not available, and the rootstock may be a source of contamination. (c) Improved technique for investigating virus diseases is needed, in view of the fact that the incubation of woody-plant virus diseases may take several years before symptoms appear. (d) So far the insect vector of only two stone fruit virus diseases are known. This is probably due to lack of knowledge and skill in handling potential vectors, certainly not to lack of interest. (e) Suitable experimental plants are not available. Peach seedlings and peach varieties on seedling roots are ideal test plants for peach viruses and a few plum and cherry viruses. They can be used indoors and out and they can be started from seed at any season. Cherry and plum have much narrower host ranges and have other limitations. (f) For efficient control practices (1) the gathering of data on the effects of several viruses on cherry trees and on the commercial yields of fruit, and (2) the elimination of the viruses from nursery plantings are objectives which so far have not been reached. The merits of quarantine regulations as they function in the control of virus disease are debatable. There is a tendency for economic considerations to outweigh those of disease control.

1593. BLODGETT, E. C. 634.25: 575.255+632.8
Peach calico.
Phytopathology, 1944, 34: 650-7, bibl. 8, being
Res. Pap. Idaho agric. Exp. Stat. 226.

A variegation of peach leaves observed on 5 trees in Idaho peach orchards was shown to be of two types. One form, apparently, of the chimera type, was not transmissible; the other, called calico, was transmitted by bud inoculation, producing extensive yellowing and finally a papery-white leaf and twig tissue. According to the author, this newly recorded virus may have some significance in furthering our knowledge on the origin of new virus, particularly in view of the possible connexion between the transmissible and non-transmissible form of the disease.

1594. THOMAS, H. E., AND OTHERS. 634.25-2.8
Dissemination of a peach mosaic.
Phytopathology, 1944, 34: 658-61, bibl. 3.

The spread of the yellow bud mosaic virus of peaches, *Inops consili*, was studied in the Winters District of Solano and Yolo Counties, California. It was found that the virus, as a rule, is transferred from one tree to the next adjacent, but that also occasional foci of infection occur at considerable distances from any apparent source. From those the

virus will spread again to immediately adjacent trees. The three commonly grown varieties, Elberta, Lovell and Muir, were equally susceptible. Further observations showed that the virus spreads readily from peach to apricot and vice versa, but apricots are very little injured and the older trees especially exhibit hardly any symptoms. Almonds, on the other hand, are much less susceptible, but once infected they suffer more severely. Finally, the possible nature of the unknown vector is briefly discussed.

1595. WHITE, N. H. 576.85+632.3.

The generic names of bacterial plant pathogens.

J. Aust. Inst. agric. Sci., 1944, 10: 78-9, bibl. 5.

The general use of Dowson's terminology for bacterial plant pathogens is advocated. The genera suggested are: *Corynebacterium* Lehmann and Newman, *Bacterium* Ehrenberg emend Dowson, *Pseudomonas* Migula emend Dowson and *Xanthomonas* Dowson. A key to these amended genera, which have been adopted in Tasmania, is presented by the author.

1596. TUKEY, H. B., AND BRASE, K. D.

634.13-2.314

An attack of fire-blight upon trees of *Pyrus betulaefolia*.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 129-30, bibl. 5.

Pyrus betulaefolia, recommended as a potential rootstock for pear, after three years in the nursery and six in the orchard at the New York State Experiment Station, suffered in 1943 the most devastating attack of fireblight (*Erwinia amylovora*) in the senior author's experience. This, despite the fact that, in the past, seedling trees of *P. betulaefolia* have been found to be immune to fireblight. If the stock is to be used, it is evident that it is only to selected types such as these that horticulture must turn.

1597. GRUBB, N. H. 634.23-2.3

The comparative susceptibility of high- and low-worked cherry trees in the nursery to bacterial canker.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 43-4, bibl. 2.

Nursery trials at East Malling indicate a much greater susceptibility of low than of high-worked Bigarreau Napoleon cherry trees to bacterial canker. Moreover at two years old from grafting there was significantly less injury on the high-worked trees when worked on a vegetatively propagated mazzard stock F12/1—a stock selected from seedlings received from the north of England—than when worked on three seedling stocks from Pennsylvania and one seedling stock from the north of England.

1598. ARK, P. A. 634.51:581.162.3:632.3

Pollen as a source of walnut bacterial blight infection.

Phytopathology, 1944, 34: 330-4, bibl. 5.

Experiments at California University, Berkeley, are described which show that bacterial blight of walnut, *Phytophthora juglandis*, may be commonly disseminated through contaminated pollen in dry weather and not only by bacteria carried in a film of water during rain from infected leaf buds and catkins. The importance of contaminated pollen may be judged from the statement that some of the larger Placenta trees carry 10,000 catkins, each containing from 1 to 4 million pollen grains. The blight organism has been recovered from dry pollen 4 months after storage in vial under laboratory conditions.

1599. MALIK, S. A., AND KHAN, M. A. 632.4

Parasitic fungi of the North West Frontier Province.

Ind. J. agric. Sci., 1943, 13: 522-7.

A list of parasitic fungi collected in the North West Frontier Province, followed by a host index.

1600. MONTGOMERY, H. B. S., AND WORMALD, H.

632.47:634.11

Silver leaf and papery bark in apple trees.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 51-2, bibl. 2.

In the experiment described silver leaf (*Stereum purpureum*) followed by severe papery bark and later by the appearance 'at the surface of the stems of the fungus fructifications resulted from hard cutting back and inoculation of the cut surfaces of Newton Wonder apple trees with the fungus. Cutting back only one branch resulted in only slight infection and little papery bark. All the trees inoculated with the fungus became infected, the degree of infection depending on the degree of cutting back. Control trees, whether severely cut back or not, showed only a little papery bark and no infection.

1601. MOORE, M. H. 632.42

"Why does my spray-programme for scab break down?"

From *Fruitgrower*, 1944, 97: 295-6, reprinted in *A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 107-8.*

The right timing of sprays is all important and is here discussed.

1602. HOUGH, L. F. 634.11-2.42

A survey of the scab resistance of the foliage on seedlings in selected apple progenies.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 260-72, bibl. 18.

Observations are presented [from Illinois] for the scab resistance of the foliage on hybrid seedlings, orchard varieties and crab-like forms of apples under conditions of severe natural infection. Several *Malus* species appeared to be entirely resistant to scab. Of these, *M. floribunda* and *M. atrosanguinea* seem to be the most resistant to all types of foliar troubles. Among the orchard varieties, Duchess and Jefferis offer the most promise as scab resistant parents and have already given a few highly resistant seedlings. In crosses between orchard varieties, scab resistance seems to be determined by several cumulative factors. However, in an F_2 population of 38 trees from the original cross of Rome Beauty \times *M. floribunda*, very clear cut segregation was observed which approximated a 1:1 ratio for resistance vs. susceptibility. A few of the seedlings from this progeny appear promising as resistant parents, in spite of their intermediate fruit size, because of their unusually good foliage and tree characters. [Author's summary.]

1603. MOORE, M. H. 634.23-2.48

Cherry scab (*Fusicladium cerasi* (Rabenh.) Sacc.) in Kent in 1943.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 54-6.

The occurrence of cherry scab on the fruits of Morello cherries at East Malling in 1943 is described. The perfect *Venturia* stage was not found. The incidence of this disease in England has hitherto been rare.

1604. SINGH, U. B. 632.42:634.11

The pink disease of apple in Kumaun.

Ind. J. agric. Sci., 1943, 13: 528-30, bibl. 9.

Corticium salmonicolor, the causal organism of the pink disease of apple, causes considerable damage to apples and pears in some Kumaun orchards, particularly under conditions of high humidity and poor light owing to bad drainage and overcropping. Inoculation experiments conducted at the Fruit Research Station, Chaubattia, United Provinces, showed (1) that the progress of the infection was greatest in August and at the beginning of September, i.e. during the rainy season and (2) that the fungus can pass between any of the following hosts: apple, pear, peach, apricot. Observations indicated that the fungus spreads mainly by means of *Necator* spores. Tests of control measures led to the

following recommendations: (a) Forks and branches should be painted with a paste of red lead and copper carbonate, equal amounts, in raw linseed (4: 4: 5) before the onset of the monsoon; (b) the pruned surface should be painted with a paste consisting of the same materials and lanoline (4: 4: 5); (c) the affected branches should be cut away at least 2 feet below the end of the infection; (d) other hosts affected by the pink disease should be destroyed.

1605. TAYLOR, G. G. 634.11-2.4

Ripe-spot of Sturmer apples.

Orchard. N.Z., 1944, 17: 2-3-5.

A progress report on 3 years' work on the fungus disease, *Neofabraea malicorticis*, ripe spot of Sturmer apples. A portion of the work has already been published in N.Z. J. Sci. Tech., 1943, 25, Sec. A, pp. 63-72, H.A., 14: 580, and a further paper is to follow in the same journal. The symptoms are detailed in abstract 580. Reasonable control with minimum fruit or foliage injury can be obtained by spraying with bordeaux 2-6-100 in mid-January and 1-4-100 in February (New Zealand seasons) and the addition of 8 oz. lime casein, well mixed, per 100 gal. of spray. This treatment will reduce visible ripe spot at picking to from 3% to 5% and will retard development of ripe spot in cool or orchard store. The slight skin injury which will follow might degrade some fruit from Extra Fancy to Fancy, but not from Fancy to Commercial. The treatment has not yet received official recommendation, but is put forward for the benefit of growers who may care to test it.

1606. WILKINSON, E. H. 634.11-2.4

Bitter rot of apples caused by *Gloeosporium album* Osterw., with special reference to the variety Allington Pippin.

A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 81-9.

Inoculation trials showed *Gloeosporium album* to be non-parasitic on living apple branches but indicate that it possibly exists saprophytically on tissues of dead twigs. In cold storage apples in 1937-9 it was found to attack through the lenticels. Other phenomena lead the author to suggest that in the Allington spot disease *G. album* acts mainly as a secondary invader of lesions initiated by functional degeneration of the lenticel tissues. Weather conditions during growth affect the formation of lenticels and hence possibly the incidence of the disease.

1607. WORMALD, H. 634.54-2.48

Nut drop—a disease of cultivated hazel nuts.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 56-8.

Examination was made of prematurely fallen cobnuts. The whole cluster dropped, even though only one nut was affected. Affected nuts showed discoloured and withered bracts with brown shells, the browning being usually more pronounced at the base. The kernels were discoloured and fungous mycelium was sometimes visible to the eye inside the nut. Of several fungi isolated, *Monilia fructigena*, the common brown rot fungus of apples, pears and plums, was the one most frequently found.

1608. KEYWORTH, W. G. 632.48: 634.22

Verticillium wilt of plum.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 53-4, bibl. 4.

Verticillium albo-atrum was isolated from a wilted Victoria plum tree which had apparently been infected from wilted hop vines thrown down round the base of the tree 11 months previously.

1609. HILDEBRAND, E. M. 634.25-2.42

Mature peach fruits affected by leaf curl.

Phytopathology, 1944, 34: 345-7, bibl. 3.

Records of mild outbreaks of *Taphrina deformans* on mature fruits of peach in various parts of U.S.A. at different times. Usually the disease is found only on immature

fruits. The effect on mature fruits is the production of large shallow, reddish lesions sometimes longitudinally or diagonally cracked and devoid of hair.

1610. MASSEE, A. M. 632.6/7: 634.1/7
Notes on some interesting insects observed in 1943.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 58-65.

Notes are given of the incidence of the following:—ghost swift moth (*Hepialus humuli*) on stored apples; great oak beauty (*Boarmia roboraria*) on apple foliage; strawberry tortrix (*Peronea comariana*); codling (*Cydia pomonella*) in apple and pear orchards; brown tail moth (*Nygmia phaeorhoea*) damaging apple and plum; dark marbled carpet (*Cidaria immanata*) on strawberry; red plum maggot (*Cydia funebrana*); soldier beetle (*Cantharis livida*) on strawberry flowers (harmless); strawberry seed beetle (*Ophonus pubescens*) (beneficial); clay coloured weevil (*Otiorrhynchus singularis*) on young apple fruits; apple blossom weevil (*Anthonomus pomorum*); apple sawfly (*Hoplocampa testudinea*); gooseberry sawfly (*Nematus ribesii*); pear and cherry slugworm (*Caliroa limacina*); hop capsid bug (*Calocoris fulvomaculatus*); green capsid bug (*Lygus pabulinus*) on strawberries; hop-damson aphid (*Phorodon humuli*) on hops; fruit tree red spider (*Oligonychus ulmi*), in apples and plums a serious pest; strawberry tarsonemid mite (*Tarsonemus pallidus*); a new red spider (*Tetranychus* sp.) on prune; an onion mite (*Petrobia lapidum*).

1611. POWELL, D. 634.1/7-2.6/7

Pest control in commercial fruit plantings. Circ. Ill. Coll. Agric. Ext. Serv. 568, 1944, pp. 43.

An advisory circular for growers covering the control of insect and mammalian pests and of some parasitic diseases of hardy tree and bush fruits. Spray schedules are given for each kind of fruit, composition and mixing of sprays is described and there are notes on commercial spray preparations.

1612. SCOTT, L. E. 634.25-1.541.11: 632.651.3
Comparison of young peach trees on Shalil and Carolina "natural" rootstocks in nematode infested soil.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 115-8, bibl. 2.

Peach trees on Shalil rootstocks (F.P.I. 63850) showed remarkable resistance to nematode injury on an infested site in S. Carolina during the first two years, especially compared to Carolina natural rootstock, at Sandhill Experiment Station, S.C.

1613. HOWARD, A. 632.651.3

The control of eelworm.

Gdnrs' Chron., 1944, 116: 96-7.

The author advocates the use of compost made on the Indore plan as a control for eelworms. The compost should be applied at the rate of 20 to 25 tons per acre and the use of artificial fertilizers, especially sulphate of ammonia, should be discontinued.

1614. SCHMITT, J. B. 632.732

The prevention and control of termite damage.

Circ. N.J. agric. Exp. Stat. 484, 1944, pp. 11.

Orthodichlorobenzene is recommended as one of the best soil poisons. Instructions are given for applying it. A brief description is given of construction features which render a building liable to termite attack and of means of obviating this.

1615. CHAPMAN, P. J., AVENS, A. W., AND PEARCE, G. W. 632.752

San José scale control experiments.

J. econ. Ent., 1944, 37: 305-7, bibl. 2, being J. Pap. N.Y. St. agric. Exp. Stat. 572.

The effectiveness of petroleum oil sprays for the control of San José scale in comparison with some other insecticides

has been confirmed. It has further been shown that with a paraffinic type of oil the oil concentration could be safely reduced to 1%, provided an efficient emulsifier were used.

1616. MASSEE, A. M. 634.11-2.753-2.96
Further notes on the woolly aphid parasite (*Aphelinus mali* Hald.).
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 65-7, bibl. 5.

Experience in Kent since 1924 indicates that the damp wet conditions obtaining are not very well suited to *Aphelinus mali*. At only one centre in Kent did the parasite become well established. Since it is apparently able to endure the very much colder conditions of parts of Russia, its overwintering in cold storage at 37° F. and in dry storage in a boarded loft is now being examined.

1617. JANCKE. 634.11-2.753-2.96
Blutlaus und Blutlauszehrwespe. (Woolly aphid and its parasite *Aphelinus mali*).
Umschau, 1942, 46: 136-7, from abstract Zbl. Bakt., Abt. II, 1944, 106: 249.

From experiments conducted over a period of years it is concluded that the parasite *Aphelinus mali* cannot supplant chemicals in the control of woolly aphid, but constitutes an additional control measure.

1618. SPEYER, W. 634.11-2.753-2.96
Über die Winterfestigkeit des Blutlausparasiten *Aphelinus mali* Hald. im niederelebschen Obstbaugbiet. (The frost hardiness of *Aphelinus mali* in the fruit growing area of the lower Elbe.)
Anz. Schädlingskde., 1942, 18: 19-21, from abstract Zbl. Bakt., Abt. II, 1944, 106: 249.

Aphelinus mali proved frost hardy during the severe winters of 1939/40 and 1940/41 in the fruit growing area of the lower Elbe.

1619. SMIT, B. 632.753: 632.951
Nicotine for aphids.
Fmg S. Afr., 1944, 19: 425-8.

In this survey of the use of nicotine against aphids in South Africa directions are given for the preparation of tobacco extracts from leaves or warehouse sweepings for spraying and for that of nicotine dusts by mixing a fine powder of quicklime with nicotine sulphate.

1620. SMITH, F. F., AND GOODHUE, L. D. 634.25-2.753
Toxicity of nicotine aerosols to the green peach aphid, under greenhouse conditions.
J. econ. Ent., 1943, 36: 911-4, bibl. 7.

The liquefied-gas method of dispersing insecticides has been used to apply nicotine in greenhouse fumigations against *Myzus persicae*. When the nicotine is dispersed in dichlorodifluoromethane only about one-half as much nicotine is required as when it is applied as a constituent of a combustible powder. At the dosages used, the liquefied-gas method also gave more uniform results in numerous replicated tests. No fire hazard is involved. [Authors' summary.]

1621. CHRISTENSEN, J. R., AND ACHARD, E. D. 634.8-1.541.11: 634.836.72
Identificación de portainjertos resistentes a la filoxera. (Identification of vine rootstocks resistant to *Phylloxera*.)
Bol. Dir. Industr. Fom. agric. (Sec. antifiloxerica Patol. vitic.) Mendoza, 1, 1943, pp. 113, bibl. 4.

A key to the identification of the *Phylloxera*-resistant vine stocks in common use, with special reference to Argentina. Keys used in other parts of the world are of little use here for many reasons. The authors contend that their system is simple, that in only a few cases can there be any ambiguity and that it can be used without any special knowledge.

1622. COX, J. A. 634.11-2.754
Sprays of 2,4-dinitro-6 cyclohexylphenol for the control of white apple leafhopper (*Typhlocyba pomaria*).
J. econ. Ent., 1944, 37: 106.

From one season's work at Virginia Experiment Station, Blacksburg, it appears that sprays of DN or the dicyclohexylamine of DN offer much promise as a control of white apple leaf hopper. No injury to foliage was observed after two applications of the DN insecticides.

1623. SPEYER, W. 632.111: 632.76
Der Ungleiche Borkenkäfer, ein Nutzniesser der vorjährigen Frostschäden. (*Anisandrus dispar* benefited by last year's frost damage to fruit trees.)
Dtsch. Obstb., 1941, Ausgabe A, No. 10, p. 190, from abstract Forschungsdienst, 1942, Vol. 14, abstr. p. 42.

The incidence of the shot hole borer, *Anisandrus dispar*, on fruit trees had greatly increased in the spring 1941 as a consequence of frost injuries suffered in the severe winter of 1939/40. Control measures are described.

1624. MASSEE, A. M. 632.78
Caterpillars of the winter moth group and of other moths.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 111-2.

The author briefly discusses the larvae of the large group of winter moths and of other moths which infest cultivated fruits. He urges the importance of controlling them by arsenical sprays early in the season before the blossom period.

1625. BORDEN, A. D. 634.1: 632.78 + 632.654.2
Xanthone in the control of codling moth and mites on apples and pears in California.
J. econ. Ent., 1944, 37: 36-42, bibl. 2.

Xanthone used at the rate of 2 lb. per 100 gal. water following two arsenical sprays controls codling moth, prevents mite injury on pears and arsenical injury to the foliage of apples in the coastal regions of California. The residue is non-poisonous and easily removed. The weathering properties are not particularly good. Xanthone should not be combined with oil sprays nor used too early on apples, especially during a period of hot weather. Although expensive, the elimination of arsenical injury to foliage during a time of rapid growth may offset the additional cost.

1626. HARMAN, S. W. 632.78: 632.951
A comparison of dust and spray programs for codling moth control.
J. econ. Ent., 1944, 37: 208-10, being J. Pap. N.Y. St. agric. Exp. Stat. 573.

As part of a larger co-operative endeavour the efficiency of dusting and spraying for codling moth was compared in a McIntosh orchard of the Western New York fruit belt near Geneva. The preliminary data covering the results of one season indicate that a 75-15-10 sulphur-lead arsenate-nicotine dust was equal in control of deep codling moth injuries to a sulphur-lead arsenate spray but significantly superior to the spray in the control of stings. An 8-20 sulphur-lead arsenate dust proved markedly successful. Although the expensive materials rendered dusting nearly twice as costly as spraying, it may be profitable under present conditions to carry out a dusting programme in view of labour shortage and the smaller initial investment required. Further tests may result in a reduction of applications recommended and therefore of cost.

1627. COLLINS, D. L., AND MACHADO, W. 632.78
Reactions of the codling moth to artificial light and the use of light traps in its control.
J. econ. Ent., 1943, 36: 885-93, bibl. 20.

Tests with light traps for codling moth control gave promising results, but our knowledge of moth behaviour and

new light sources will have to be developed, before a profitable application of this control measure can be expected.

1628. YOTHERS, M. A., CARLSON, F. W., AND CASSIL, C. C. 632.78

Tests of 4,6 dinitro-o-cresol emulsion against overwintering codling moth larvae.

J. econ. Ent., 1943, 36: 882-4, bibl. 2.

In orchard tests spraying in the dormant stage with an emulsion of 4-6-dinitro-o-cresol, stove oil and an emulsifier was found to kill 95% of the overwintering codling moth larvae at a cost of 8 c. per gallon, 2-5 gallons being required per average-size bearing tree.

1629. ALLEN, H. W., AND BRUNSON, M. H. 634.25-2.78: 634.11

The effect of proximity to apple on the extent of oriental fruit moth injury in peach orchards.

J. econ. Ent., 1943, 36: 879-82, bibl. 4.

Extensive observations and statistical analyses showed that infestation of peach orchards with oriental fruit moth (*Grapholitha molesta*) and subsequent fruit injury may be increased by migration of the pest from adjacent apple orchards or interplanted apple trees. The increase in damage, however, was not sufficiently serious to render the planting of peaches in the proximity of apples inadvisable, if the locality were otherwise particularly suitable. The data were collected at the Moorestown, N.J. laboratory of the Bureau of Entomology and Plant Quarantine.

1630. DRIGGERS, B. F. 632.78: 632.96

Oriental fruit moth parasite liberations and surveys.

J. econ. Ent., 1944, 37: 235-7, bibl. 5, being

J. Ser. Pap. N.J. agric. Exp. Stat.

A survey of the parasitism of Oriental fruit moth over a period of 7 years showed *Macrocentrus ancylivorus* to be the most numerous larval parasite on twig-feeding larvae in peach orchards of central and southern New Jersey, where it had been liberated, whilst *Glypta ruficuttellaris* proved to be dominant in northern New Jersey.

1631. SNAPP, O. I., AND CULLINAN, F. P. 634.25-2.78

The effect on peach trees of ethylene dichloride used for control of the peach tree borer.

J. econ. Ent., 1944, 37: 47-51, bibl. 4.

When used at the recommended quantity and strength ($\frac{1}{2}$ pint of 20% emulsion for mature trees or of 15% emulsion for 3-year-old trees) and applied to the soil around the base of the tree so that none touches the trunk directly, ethylene dichloride did not injure peach trees at the Beltsville Research Centre, U.S. Department of Agriculture. Injury occurred when higher strengths or larger quantities were used or when applied to heavy soils in late autumn when temperatures were low.

1632. WHITCOMB, W. D., TOMLINSON, W. E., JR., AND GUBA, E. F. 634.8-2.78

The grape plume moth. With notes on other pests of grapes in Massachusetts.

Bull. Mass. agric. Exp. Stat. 409, 1943, pp. 20, bibl. 15.

The life history of the grape plume moth, an abundant pest of Massachusetts home vineyards, is described, partly for the first time. Systematic pruning and spraying about 15 April with 3% oil emulsion or 1% sodium dinitro cresylate are the control measures recommended. Notes on some diseases and on the biology and control of a number of minor grape pests are also given.

1633. WILSON, H. K. 632.5

Control of noxious plants.

Bot. Rev., 1944, 10: 279-326, bibl. 409.

In U.S.A. the annual losses from weeds amount to three thousand million dollars, or more than double the loss from

insect pests and livestock diseases combined. Yet the funds expended on weed control research are comparatively small, probably because of lack of appreciation of the seriousness of the problem. The present paper is a comprehensive review of the research carried out on weed control and the results obtained, special attention being paid to more recent work. It should prove valuable for reference.

1634. FRAZIER, J. C. 632.51

Nature and rate of development of root system

of *Apocynum cannabinum*.

Bot. Gaz., 1944, 105: 463-70, bibl. 10, being

Contr. Kans. agric. Exp. Stat. 455.

This study of dogbane, *Apocynum cannabinum*, is the fourth of a series of investigations on noxious perennial weeds carried out by the Kansas Agricultural Experiment Station.

1635. DEFRANCE, J. A. 632.954

The killing of weed seed in compost by the use of certain fertilizers and chemicals.

Proc. Amer. Soc. hort. Sci. for 1943, 1943,

43: 336-42, bibl. 6.

At Rhode Island Experiment Station the mixing with compost of certain fertilizers containing nitrogen proved to be of considerable value in destroying nearly 100% of weed seeds. Some of the artificial fertilizers, e.g. cyanamide and ammonium sulphate + limestone, did not generate heat but were as effective as those that did. Successful quantities per cu. yd. of compost in wooden bin tests were as follows: Milorganite 83 lb. (supplying N 5 lb.), Agrinit 62 lb. (N 5 lb.), calcium cyanamide 5 and 10 lb. (N 1 and 2 lb.), ammonium sulphate 25 lb. + ground limestone 25 lb. (N 5 lb.), chloropicrin 1 lb. Chloropicrin did not appear to kill clover seed.

1636. MEADLY, G. R. W. 632.51

The blackberry or bramble.

J. Dep. Agric. W. Aust., 1944, 21: 17-28, bibl. 3.

A series of experiments designed by the State Weeds Committee showed that the cheapest way of destroying blackberries on a large scale in Western Australia is to spray the infested area with a weak solution of sodium arsenite, which causes drying of the above-ground portions, and to burn the lot a couple of months later. Details of the solution applied and of other treatments tested are given.

1637. CARVALHO, J. C. M., AND GUNDERSON, H. 632.693.2

Métodos de combate a ratos e camundongos.

(Methods of controlling the common rat and the Brazilian house rat.)

Ceres, 1944, 5: 154-71.

Methods of dealing with rats in Brazil are discussed under the following heads. Ratproof buildings; prevention of access to food supplies; gassing and poisoning; trapping; by natural enemies; bacteria; publicity campaigns; Rodier's method. In Brazil the natural enemies of rats are given as cats, cobras, owls and fox-terriers. Bacterial infection is not advocated, because it is almost certain that the rats finally develop immunity. The Rodier method consists in catching the rats alive, destroying the females and liberating the males. The male rat is polygamous and requires a number of females. If the number of females is much reduced, the male rats take to attacking each other, their young, and also the surviving females. The authors have had no experience of this method and have doubts as to its value in Brazil. The article is well illustrated.

1638. BHATTACHARYA, B. K., AND DE, S. P. 632.953

Antibacterial agents in flowers.

Curr. Sci., 1944, 13: 182-3, bibl. 5.

Glacial acetic acid extracts of certain flowers, especially of *Rosa damascena* and *Tagetes erecta*, were found to contain antibacterial agents. A more elaborate investigation is required.

1639. FAWCETT, H. S. 632.6/7: 632.96: 632.3/4
Fungus and bacterial diseases of insects as factors
in biological control.
Bot. Rev., 1944, 10: 327-48, bibl. 90.
This survey of knowledge on entomogenous parasites (fungi or bacteria parasitic on insects) suggests that the initial failure of some trials with liberated fungus spores or bacteria should not discourage pathologists from further exploring this important method of pest control. Virus diseases of insects should also be investigated. Some instances where the artificial spread of fungi has helped to achieve commercial control are: *Metarrhizium anisopliae* started early epidemics of froghoppers in Trinidad; *Aschersonia aleyrodis* and *Aegerita webberi* kept whitefly larvae (*Dialeurodes*) on a low level in Florida; species of *Sphaerostilbe*, *Nectria*, *Podonectria* and *Myriangium* appeared to control most scale insects in Florida. Species of *Aspergillus* and *Entomophthora* are important parasites on mealy bugs, *Empusa* and *Entomophthora* on aphids, a species of *Spicaria* on cottony cushion scale and one of *Rhinotrachium* and an undetermined fungus on mites. *Bacillus C*, a spore-forming bacterium, gave good control of the California red scale under certain conditions.
1640. MARSH, R. W. 634.723-2.4
The use of copper sebacate as a foliage spray.
A.R. Long Ashton agric. hort. Res. Stat. for 1943,
1944, pp. 77-80, bibl. 4.
In trials at Long Ashton it was found that copper sebacate mixed dry with half its weight of Agral II readily formed a stable suspension suitable for spraying. This spray, used at 0.1% Cu and 0.2% Agral, did not stick so well as a comparable bordeaux-Agral spray, but was not inferior to it in controlling leaf spot of black currants.
1641. TAM, R. K., AND CLARK, H. E. 631.841.5: 632.944
The action of calcium cyanide as a soil disinfectant.
Soil Sci., 1944, 57: 359-65, bibl. 18.
Calcium cyanide as Cyanogas was applied to a Hawaiian lateritic soil of pH 4.4 at the rate of 80 p.p.m. of nitrogen. Under conditions provided by a mulch paper cover and abundant moisture 81% of the nitrogen in the Cyanogas was recovered in the soil 26 weeks later. There was evidence that the nitrifying organisms in the soil had been completely eliminated. The cyanide had little effect on the population of fungi and actinomycetes. Cyanogas inhibited nitrification for a period as did other soil disinfectants such as chloropicrin, steam, and formaldehyde, but alone of these Cyanogas contributed a considerable amount of nitrogen to the soil.
1642. GLASGOW, R. D., AND BLAIR, R. 632.943: 662.2
The use of explosives for the application of
insecticide dusts.
J. econ. Ent., 1944, 37: 230-4.
Very successful pioneer work in developing a quite unconventional method of pest control in forest and park areas has been done at the New York State Museum, Albany. Charges of insecticide dusts were fired from mortars and the air currents following the explosion were found to give an excellent distribution under the right weather conditions. The use of cemented paper mortars would render the treatment inexpensive and its application in many fields of pest control in war and peace is visualized.
1643. M(ONTGOMERY), H. B. S. 632.95
Amendments to spray calendar, 1942 edition.
A.R. East Malling Res. Stat. for 1943, A27,
1944, p. 114.
The original calendar was issued as part of the annual report for 1941, noted in *H.A.*, 12: 1334.
1644. MARTIN, H., STRINGER, A., AND WAIN, R. L. 632.951
The qualitative examination of insecticidal
properties. Progress report—1943.
A.R. Long Ashton agric. hort. Res. Stat. for 1943,
1944, pp. 62-76, bibl. 22.
Qualitative tests for the examination of stomach poisons, contact insecticides and repellents (insectifuges) are described. It is shown that, against the insects tested:—1. Rotenone and rotenone-containing insecticides have little contact insecticidal action and, as stomach poisons, are specific in action, being toxic to *Pieris* larvae at concentrations far below those tolerated by *Mamestra* larvae, against which some repellent action is shown. 2. Of certain polychlorethane derivatives, *aa-bis* (p-chlorophenyl)- $\beta\beta\beta$ trichlorethane has a marked potency both as stomach poison and contact insecticide. 3. Dinitro-o-cresol exhibits pronounced contact toxicity and deterrent action, but reduction of one of the nitro groups leads to a loss of both contact and repellent properties. 4. Dodecyl thiocyanate and butyl carbitol thiocyanate are deficient in stomach poison properties, while dodecyl nitrile is non-toxic but shows slight repellent properties. 5. The thiuram sulphides tested are non-toxic but slightly repellent. 6. Thiodi-phenylamine (phenothiazine) is highly repellent to *Pieris* larvae but has no action on *Mamestra* larvae. [Authors' summary.]
1645. SWINGLE, M. C., GAHAN, J. B., AND MAYER, E. L. 632.951
Laboratory tests of synthetic organic compounds as insecticides.
J. econ. Ent., 1944, 37: 70-4, bibl. 3.
None of 82 synthetic organic compounds tested by the U.S. Bureau of Entomology appeared useful as a practical insecticide. The list is given in full.
1646. TUFT, P. H. 632.951
Some modifications of procedure when using
eggs of *Aphis pomi* (de Geer) for the biological
evaluation of insect ovicides.
A.R. East Malling Res. Stat. for 1943, A27,
1944, pp. 67-8, bibl. 2.
A method of using eggs of the green apple aphid for the biological testing of insecticides at East Malling was described by Steer in 1938 (*J. Pomol.*, 15: 338, *H.A.*, 8: 108). Considerable improvements have now been introduced. The technique involved in collecting and transporting material to the laboratory, the use of alcoholic potash as a solvent for removing the eggs from the twig and a simple improved, egg counting device are here described.
1647. ALEXANDER, P., KITCHENER, J. A., AND BRISCOE, H. V. A. 632.943
Inert dust insecticides. I. Mechanism of action.
II. The nature of effective dusts. III. The
effect of dusts on stored products pests other than
Calandra granaria.
Ann. appl. Biol., 1944, 31: 143-9, bibl. 17, 150-6,
bibl. 13, 156-9, bibl. 5.
I. Inert dusts kill insects by desiccation. II. Effectiveness is bound up with particle size and intrinsic hardness. Carborundum is most effective at 2 μ decreasing in effectiveness with increasing size and being totally ineffective at 15 μ . Materials softer than calcite are ineffective. Some dry-ground powders are inferior to those wet-ground. A theory is proposed to explain the mechanism whereby dusts promote evaporation of water from insects. III. The effectiveness of certain inert dusts on a number of insect pests of stored products was tested. The mealworm is particularly susceptible and the case is given special investigation.

1648. CARTER, R. H., MANN, H. D., AND SMITH, C. M. 632.951

The chemical nature of copper-arsenic insecticides.

J. econ. Ent., 1943, 36: 941-2, bibl. 9.

Notes and analytical data on 7 copper-arsenic compounds used as insecticides.

1649. PIENIAZEK, S. A., AND CHRISTOPHER, E. P. 634.11-2.952: 581.13

The effect of some new spray materials on the rate of apparent photosynthesis of apple leaves.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 105-6, bibl. 3.

Sprays were ferimate (i.e. 70% ferric dimethyldithiocarbamate) and Q₁ (lauryl pyridinium chloride). The former had the most reducing effect on photosynthesis. Neither was so effective in this respect as lime-sulphur.

1650. MITCHELL, A. E., AND CHILDERS, N. F. 634.11-2.95

Further studies on effects of mild and caustic sprays on apple leaves.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 111-5, bibl. 8.

Work in Ohio indicates that the effect on apple leaves of Kolofog, which is made by the absorption of fused sulphur into bentonite, is not harmful, in fact it may be slightly stimulating.

1651. CHRISTOPHER, E. P., PIENIAZEK, S. A., AND JENNINGS, C. 632.951

Lime as a "safener" in lime sulphur and lead arsenate sprays.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 101-4, bibl. 6.

No confirmation was obtained of claims that lime may be effectively used as a protectant against plant injury in combination sprays of lime-sulphur and arsenate of lead.

1652. MUNRO, J. W. 632.951

"D.D.T.": A new insecticide.*

Nature, 1944, 154: 352-3, bibl. 3.

An account of the insecticide known as D.D.T. or Gesarol. The term "pure D.D.T." designates *para-para*-dichlorodiphenyl-trichloroethane, which is the most active isomer. D.D.T. has proved an unusually effective insecticide with more uses than any single substance so far available, but the assumption that it will rapidly replace all the older insecticides is unwarranted. The great work of the U.S.A. government departments, research institutions and other workers in the exploitation of and research on D.D.T. in connexion with war needs has been fully told; in Great Britain the no less magnificent effort made by workers in many fields, administrative and technical, has been shrouded in official reticence. The hope is expressed that the herculean efforts now being made to destroy insect vectors of disease and depredators of crops and food stores will not be allowed to lapse as in 1919, and that later some credit may be given to the able and distinguished leadership in both military and civil branches which has made the startlingly successful development of D.D.T. possible.

1653. CHAMBERS, V. H., AND HEY, G. L. 632.951

An experiment with D.D.T. for the control of apple blossom weevil.

Reprinted from *Fruit*, undated, pp. 2.

CHAMBERS, V. H., HEY, G. L., AND SMITH, N. K. D.D.T., the new insecticide.

Market Gr, 1944, Vol. 22, No. 29, pp. 12-3; No. 30, pp. 12-3; No. 31, pp. 10-1; No. 32, pp. 12-3.

HEY, G. L.

A note on D.D.T.

Gdnrs' Chron., 1944, 116: 112.

In the first of these articles very promising results are recorded from the use of D.D.T. (or Gesarol) against apple blossom weevil (*Anthonomus pomorum*).

* See also 1841.

In the second the authors very briefly summarize published results of trials to date in Great Britain, Switzerland and U.S.A. and much the same is done, rather more briefly, in the third article. D.D.T. has proved effective against such difficult pests as apple blossom weevil, leaf-eating weevils, pollen beetle, carrot fly and pea and bean weevils. It is non-poisonous to humans and hence is appropriate for use in the control of caterpillar on fruit trees, codling moth and tomato moth. It is more effective than derris against flea beetles and cabbage caterpillars. It has been found effective against Colorado beetle, raspberry beetle, cockchafer, plum sawfly, ants, woodlice and earwigs. It does not appear to be so good as nicotine against aphids. Incorporated in an oil spray, it has controlled red spider. Incidentally, apart from very small amounts available for experimental purposes, the whole of the American and English supplies are at present earmarked for use by the Armed Forces.

1654. ANNAND, P. N., AND OTHERS. 632.951

Tests conducted by the Bureau of Entomology and Plant Quarantine to appraise the usefulness of DDT [Gesarol] as an insecticide.

J. econ. Ent., 1944, 37: 125-59.

An account of some tests of the effect of Gesarol on some 50 pests, about 30 of which attack plants and are of interest to horticulturists.

1655. DRIGGERS, B. F. 632.78: 632.951

Performance of dichlorodiphenyl trichloroethane (DDT) used against the oriental fruit moth.

J. econ. Ent., 1944, 37: 120-1.

CARMAN, C. E., AND FLESCHNER, C. A.

Laboratory tests on the oriental fruit moth with special reference to DDT.

J. econ. Ent., 1944, 37: 122-3.

LINDGREN, D. L., AND BOYCE, A. M.

Results with dichlorodiphenyl trichloroethane in control of California red scale.

J. econ. Ent., 1944, 37: 123-4, bibl. 1.

Records the successful employment in field or laboratory of the insecticide variously known as Gesarol, DDT and GNB-A.

1656. GOLDMAN, S. 632.95

The new speedsprayer.

Wis. Hort., 1944, 36: 268.

A note of a trial with a new type of sprayer in Wisconsin orchards. The Speedsprayer, developed by the John Bean Mfg. Co., U.S.A., is said to eliminate the human element in spraying and is operated through a set of controls by the tractor driver. Any tractor can be used. Operation is not dependent on high pressures. The spray as it emerges from a large number of small nozzles is caught by the blast from an aeroplane-type propeller and distributed with force over the trees. This propeller is 48 inches in diameter and operated by a 75 h.p. petrol engine. Windy weather which would render ordinary spraying impracticable had no effect on the performance of the Speedsprayer. The 500 gallon tank empties in from 12 to 15 minutes. The outfit should cover 35 to 40 acres in a 10-hour day. It is already in use in Florida and in some Maryland and Virginia orchards.

1657. SU-SIN LEE, C., AND HANSBERRY, R. 632.951 + 633.88

Toxicity of some Chinese plants.

J. econ. Ent., 1943, 36: 915-21, bibl. 4.

Of thirty-five species of Chinese plants, tested for their insecticidal, piscicidal or medicinal value at the New York State College of Agriculture, Ithaca, *Pachyrhizus erosus* offered the best prospects of commercial exploitation. The seeds of this plant could be gathered in large quantities in Latin America where it is grown for its tubers. Another source of a potential insecticide are the seeds of *Milletia pachycarpa*, the experimental propagation of which is

- recommended. Further work on *Delphinium delavayi*, *Tripterygium forrestii*, *Phytolacca acinosa*, three species of *Aconitum* and unidentified species of *Celastrus* and *Palaquium* is also suggested. Silk worms, bean beetle larvae and bean aphids were used as test organisms, the results being tabulated.
1658. ROARKS, R. C. 632.951
"Incompatibility" of insecticides.
J. econ. Ent., 1944, 37: 302, bibl. 3.
The publication is advocated of a chart entitled "Recommended combinations of spray materials", where effective and ineffective or harmful combinations could be indicated by connecting lines of different colours. The value of such a chart would be enhanced by a high degree of specificity in its recommendations in respect of disease or pest, host and region.
1659. BOWEN, C. V. 632.951
Insecticidal possibilities of *Duboisia hopwoodii*.
J. econ. Ent., 1944, 37: 293, bibl. 6.
Analysis of a sample of *Duboisia hopwoodii* from Australia showed the leaves to contain 3.31% nicotine. It is suggested that the plant should be exploited as a source of insecticidal material and that the alkaloid content could be further improved by cultural practices.
1660. DRAIN, B. D., SIMANTON, W. A., AND MILLER, A. C. 632.951: 615.779.1
Studies on clonal strains of pyrethrum.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 521-4.
Clonal strains of pyrethrum isolated by crown division generally retained their insecticidal properties and rating from year to year. Cuttings and very small crown divisions can be successfully used for the quick propagation of high test plants if carefully handled.
1661. RAZDORSKAJA, L. A. 632.951
Tephrosia in the humid sub-tropics of the U.S.S.R. [Russian.]
Priroda (Nature), 1943, No. 1, pp. 67-70.
A preliminary account of the cultivation of eight *Tephrosia* species in Transcaucasia. The highest contents of rotenone and the allied group of lactones was found in *T. vogelii* Hook. The leaves, bark, decorticated stems and roots in that order contained up to 1.92, 1.40, 0.72 and 0.47% of rotenone substances respectively. The plants were grown from seed planted in the open; it was experimentally shown that the plant can also be propagated by stem cuttings.
1662. BAKER, E. W. 634.1/7-2.77
(20) Studies on the response of fruit flies to temperature.
J. econ. Ent., 1944, 37: 280-3, bibl. 2.
COSTA, A. S. 632.8
Quantitative studies with carborundum and its use [as an abrasive] in local-lesion virus tests.
Phytopathology, 1944, 34: 288-300, bibl. 12.
FISKE, J. G. 632.51
Weeds of New Jersey.
Circ. N.J. agric. Exp. Stat. 416, 1941, pp. 51.
FREAR, D. E. H., MILLER, H. J., AND FAGAN, F. N. 632.95
Comparative spray deposits and scab control from speed sprayer and single-multiple gun sprayer.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 129-33, bibl. 4.
FREAR, D. E. H. 632.95
Deposition and retention of sprays. III. Apparatus and methods for laboratory spraying.
Bull. Pa. agric. Exp. Stat. 463, 1944, pp. 18, bibl. 14.
GOODHUE, L. D., AND SMITH, F. F. 632.654.2: 632.951
The effect of some insecticides in aerosol form against the cyclamen mite on snapdragon.
J. econ. Ent., 1944, 37: 214-8, bibl. 5.
- HARTZELL, F. Z., AND HORSFALL, J. L. 634.8-2.753
A method for evaluating treatments for grape leafhopper and for analyzing the heterogeneity of the infestation.
J. econ. Ent., 1944, 37: 219-24, bibl. 9, being *J. Pap. N.Y. St. agric. Exp. Stat.* 571.
HINRICHS, H., BIEBERDORF, G. A., AND CROSS, F. B. 634.521-2.78
Pecan nut casebearer (*Acrobasis caryae*).
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 123-8, bibl. 6.
HUTZEL, J. M., AND HOWARD, N. F. 632.951: 632.76
Sources of variations in the effectiveness of derris dusts.
J. econ. Ent., 1944, 37: 65-9, bibl. 6.
Against Mexican bean beetle.
JENNY, J. (Appendix by HÖHENER, A.) 632.95
Ueber die technisch-wissenschaftlichen Grundlagen der Pflanzenspritzen. (The technical and scientific basis of plant-spraying apparatus.)
A. Stutz, Wädenswil, (undated), pp. 113, from review *Schweiz. Z. Obst-u. Weinb.*, 1944, 53: 191.
JOLEY, L. E., AND BRADFORD, F. C. 634.25-2.111
Variations in blossom hardness within a hardy group of peaches.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 79-83, bibl. 8.
LOYD, D. C. 632.78: 632.96
A study of the codling moth and its parasites in California.
Sci. Agric., 1944, 24: 456-73, bibl. 33.
MCLEOD, W. S. 632.951
Further refinement of a technique for testing contact insecticides.
Canad. J. Res., 1944, 22, Sec. D, pp. 87-104, bibl. 18.
MILES, H. W. 632.765
The wireworm survey in the western province 1942-3.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 111-8, bibl. 2.
SPILLER, D. 632.752
The seasonal cycle of the hard-wax scale [*Ceroplastes sinensis*] in New Zealand.
N.Z. J. Sci. Tech., 1943, 25, Sec. A, pp. 129-30, bibl. 2.
STEVENSON, J. A., AND CASH, E. K. 582.8
The new fungus names proposed by C. G. Lloyd.
Bull. Lloyd Library, 35, 1936 (received 1944), being *Mycol. Ser.* 8, pp. 209.
TESKE, A. H., AND ZIELINSKI, Q. 634.11-2.4
The [successful] use of fermate for the control of bitter rot and cedar rust of apple.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 107-8.
TURNER, N. 632.951
Fluorine compounds as alternates for rotenone-bearing dusts.
J. econ. Ent., 1944, 37: 242-5, bibl. 11.
WAIN, R. L. 632.76
The secretion of salicylaldehyde by the larvae of the brassy willow beetle (*Phyllodecta vitellinae* L.).
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 108-10, bibl. 7.
WATT, A. S. 632.54
Contributions to the ecology of bracken (*Pteridium aquilinum*). II. The frond and the plant.
New Phytol., 1943, 42: 103-26, bibl. 3.

VEGETABLES, FIBRES AND OTHER PLANTS.

1663. GILES, W. F. 635.1/7
Our vegetables: whence they came.
J. roy. hort. Soc., 1944, 69: 132-8, 167-74,
summary in *Nature*, 1944, 154: 330-1.

A lecture on the origin of vegetables, given at the Royal Horticultural Society on 21 March, 1944, provides some interesting and out of the way information. Most vegetables are of ancient origin. Onions, though less strongly flavoured than northern sorts, and radishes were eaten by the workmen who built the Pyramids, beans are referred to in the Book of Samuel and gourds and cucumbers in the Book of Kings. Pliny, writing 2,000 years ago, describes some of the vegetables of the time, as do other ancient writers, but definite information is not really available till the sixteenth century when Gerarde in his *Herbal* (1597) described and illustrated a number of types. The speaker remarked that after such a lengthy period of cultivation it is extraordinary that they were not better. Considerable improvement took place during the seventeenth and eighteenth centuries. Vil-morin's production in four generations of biennial red-rooted carrots, from annual white-rooted wild plants and Buckman's production from the wild parsnip after 10 years' selection of the parsnip Student in 1847 (still in cultivation) are two outstanding examples of vegetable introductions of the last century. Peas, grown by the Greeks 400 years before Christ, were an important crop in England in the eleventh century. The peas of Gerarde were round seeded, but wrinkled peas were grown on the continent in 1552. Thomas Andrew Knight in 1787 first brought the wrinkled types into general esteem by means of controlled crossing, which resulted in Knight's Green Wrinkled and Knight's White Wrinkled peas. Scarlet runner beans were introduced as ornamental plants from South America in 1633 but were not eaten till the eighteenth century. The broad bean is one of the oldest cultivated esculents, having been grown by the early Egyptians. The tomato was brought to Europe from South America in the fifteenth century. The fruits were of a corrugated form and were considered unwholesome, so that even 50 years ago many were afraid to eat them. The onion is of great antiquity, its original home is thought to be Baluchistan. Beet has developed from the wild plant native to British coasts. The most spectacular development has been that of the brassicas, for kale, cabbage, savoy, brussels sprouts, broccoli, cauliflower and kohlrabi and their hundreds of distinct varieties have all developed from *Brassica oleracea*, a plant still growing wild on the sea cliffs of England and in some other parts of Europe. Mr. Giles demonstrated the close affinity of various brassicas with the wild *B. oleracea* by crosses, which all produced fertile hybrids of great morphological variability but of only incipient horticultural promise. Cauliflower originated in Cyprus and its development in Italy and the Mediterranean coast, where it will ripen seeds, is discussed.

1664. STRICKLAND, A. G. 635.1/7(94)
Vegetables and vitamins.
J. Dep. Agric. S. Aust., 1944, 47: 381-3.

The revolutionary development of the Australian vegetable industry is briefly described in a broadcast. In order to satisfy the largely increased demand complete mechanization is necessary, which will be very shortly achieved as a result of the partial switch-over in Australia from munition production to the manufacture of agricultural machinery and of implement imports from America.

1665. BARRONS, K. C. 635.1/7: 631.521
Vegetable varieties for commercial production in Michigan.
Circ. Bull. Mich. agric. Exp. Stat. 191, 1944, pp. 35.

A summary of information concerning the best vegetable varieties for commercial production in Michigan. It is

suggested that more attention should be paid to modern consumers' requirements such as smaller sizes in squash, cabbage and water melon. A good appearance is more considered than any other one factor both by the merchant and the ultimate consumer and is highly important in a competitive market.

1666. CULPEPPER, C. W., CALDWELL, J. S., AND LOMBARD, P. M. 664.84.047: 635.1/7
Comparative studies of varieties of certain vegetables for dehydration.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 210-8, bibl. 5.

Potatoes. All varieties employed in the trial proved suitable for dehydration. Largest yields of dry product came from those high in specific gravity. Physiologically immature potatoes give an unsatisfactory product. *Onions.* Highly pungent varieties are needed for army use since much of the original pungency is lost in dehydration. The pungency remaining after dehydration is proportional to that previously existing between varieties. Ebenezer is recommended for pungency and high yield. *Sweet corn.* Nearly every variety proved satisfactory. The drying of sweet corn was a new experiment. The most desirable stage in dehydration was reached when the grains were 40% to 50% of the mature dry weight of grains of the variety. For harvesting, the cobs should be at the same stage of maturity as when used for whole grain canning. *Snap beans.* To be acceptable for dehydration a variety must be one in which the development of the fibrous layer in the side wall of the pericarp is minimum in amount and begins late in the growth of the pod. The best 3 varieties of 13 in these respects were Asgrow Stringless Green Pod, Lazy Wife Pole and Dwarf Horticultural (Speckled Cranberry). *Sweet potato.* A highly important crop for dehydration. Qualities sought are retention of flavour, smoothness of texture, and freedom from toughness, starchiness, excessive fibre and from tendency to darken in drying or cooking. Varieties are classified into 5 grades according to their degree of suitability for canning. Classified as excellent are Nancy Hall, Myers Early, Mullihan, Mameyita and Nancy Gold.

1667. NISSLEY, C. H. 635.1/7
The home vegetable garden.
Circ. N.J. agric. Exp. Stat. 458, 1943, pp. 28.

An attractive booklet, full of useful information on the lay-out and management of vegetable gardens on farms and in the back yard.

1668. KÄMPFER, M. 635.1/7
Entwicklung und gegenwärtiger Stand des Qualitätsbegriffs bei Gemüse. (Quality in vegetables; what the term implies.) [English summary ½ p.]
Landw. Jb., 1944, 93: 523-626, bibl. 437.

The paper, which is an abridged edition of a thesis submitted to Berlin University, is a contribution of the Institute of Vegetable Growing, Grossbeeren, a branch of the Berlin-Dahlem horticultural research station. The species considered, numbering about 60, are divided into the following groups: (1) Root and tuber vegetables; (2) leek-like vegetables; (3) leaf vegetables; (4) flower, stem and shoot vegetables; (5) fruit vegetables and (6) seed (=leguminous) vegetables. Quality may be judged by two different standards: marketing value and so-called biological value, both of which are considered at length. The latter is defined as the total content of such constituents as determine the health and nutritional value of a vegetable. As the evaluation of quality on the basis of all contributing factors would be an impractical procedure at present, standardization everywhere has been based on a few easily measured, external characters with due consideration for trade requirements and the psychological appeal to the consumer. The

evolution of quality standards in different countries is described and changes in fashion are illustrated by a few examples. For instance it is worth comparing the large ribbed tomato, the desirable prototype of 1890, with the small fruit and smooth shape of to-day. Regulations in respect of standardization of vegetables as they have developed in the following countries are compared in detail: Holland, U.S.A., Germany, Italy, France, Morocco, England, Denmark, Switzerland and Sweden, the comparison between countries of similar economical structure offering particular interest. The second part of the treatise is devoted to the biological conception of quality in vegetables and it is shown that classifications made according to marketing and nutritional standards do not always agree. Smaller size, for instance, is often associated with higher biological value. From the many pertinent data assembled, some unpublished results of Schuphan, Director of the Grossbeeren Institute, may be mentioned. He found that malformed grade C tomatoes of the variety Sieger had a higher ascorbic acid and a lower carotene content than fruit grades A and B, whereas abnormally shaped beans of the variety Hinrich's Riesen showed a marked decrease in vitamin C and sugar content compared with normal pods. The internal factors which influence the biological value are discussed at length. They are: genetical influences, such as variety and polyploidy; developmental stage and degree of maturity; differences in size and weight and internal structure of the plant. External influences under review are those of environment and nutrition. The effects of post-harvest treatment and cooking are also dealt with. The author hopes that the conception of biological value will be introduced as an additional standard into the grading of vegetables under Government control as soon as suitable simple methods for its evaluation on a big scale have been developed. The realization of this aim may be envisaged for mass production in a defined area. The bibliography contains 437 titles, mostly of recent date.

1669. METCALFE, C. R. 633/635-1.56
History and recent work of the Jodrell Laboratory,
Kew.
Ann. appl. Biol., 1944, 31: 166-7.

A brief record of the work of the Jodrell Laboratory. Recent work since the war has been a re-investigation of the potentialities of the stinging nettle, *Urtica dioica*, demonstrating the great tensile strength of the fibre and the practicability of preparing special paper, textile yarns and artificial silk from the stems. Determination of the rubber content of laticiferous members of the *Compositae* and *Euphorbiaceae* has been undertaken.

1670. MOORE, L. B. 582.6
New Zealand seaweed for agar-manufacture.
N.Z. J. Sci. Tech., 1944, 25, Sec. B, pp. 183-209,
bibl. 22.

Investigation by the Botany Division showed that the seaweeds *Pterocladia lucida* and *P. capillacea* yield a good agar and that they occur in commercial quantities in the North Island and about Kaikura. The life history of the algae, their habitat and the agar manufacturing process are described.

1671. ATKINSON, H. J., PATRY, L. M., AND WRIGHT, L. E. 581.192; 631.8
Plant tissue testing.
Sci. Agric., 1944, 24: 437-42, bibl. 6, being
Sci. Contr. Div. Chem., Sci. Service Canada 107.

The application of Thornton's method of plant tissue testing as a means of determining fertilizer requirements was studied at the Central Experimental Farm, Ottawa, tomatoes, potatoes and maize being used as test crops. Although individual plants varied considerably, the results of this preliminary investigation showed a certain agreement with the yield figures obtained from a number of fertilizer

treatments. The authors intend to explore the possibilities of the method in a further investigation.

1672. HEWITT, E. J. 632.19: 631.589: 663.61
Experiments in mineral nutrition. 1. The
visual symptoms of mineral deficiencies in
vegetables and cereals grown in sand cultures.
Progress report No. 1, 1943.
A.R. Long Ashton agric. hort. Res. Stat. for 1943,
1944, pp. 33-47.

Dr. Wallace's work was continued in 1943 with sand cultures of 23 crops, the chief aims being (a) the extension and confirmation of present records of typical deficiency symptoms, (b) the determination of the effects of added sodium sulphate and sodium chloride with special reference to the use of salts as fertilizers, (c) a study of the problems involved in maintaining large-scale deficiency trials of a number of crops, (d) the development of an economical trace element deficiency technique using rain and distilled water. Results are summarized thus:—"With the rain-water technique, using chemicals of re-crystallized or A.R. standard and unwashed sand, deficiencies of the following were observed: Nitrogen, potash, phosphorus, magnesium, in cauliflower, lettuce, radish, sugar beet, broad bean, red clover, flax, tomato, potato; nitrogen, potash, phosphorus, in barley; phosphorus in rape, cabbage, swede, turnip; calcium in flax, tomato, potato; magnesium in maize, cabbage, turnip, dwarf bean; boron in cauliflower, marrow-stem kale, celery. No significant effects were observed with additional sodium sulphate and chloride; and only slight paling was noted in sulphur deficiency; iron and manganese deficient cultures produced no leaf symptoms. With the distilled water technique, using A.R. grade or highly purified chemicals and unwashed sand, deficiencies of the following were observed:—Iron in sugar beet, flax; boron in cauliflower, tomato; manganese in tomato. Toxicity symptoms in tomatoes were observed with excess boron. The use of unwashed sand is suitable for major element deficiency cultures and boron and manganese deficiencies, in some crops, but not for iron deficiency. The method of pretreatment with complete nutrient before sowing is suitable for deficiencies of nitrogen, phosphorus, potash, and magnesium in most plants. It is unsuitable for calcium deficiency, and for potassium and magnesium deficiencies in cereals." [From author's summary.]

1673. BROWN, H. D., SCHULKERS, R. D., AND SHETLAR, M. R. 635.1/7: 632.19: 577.16
Effect of mineral deficiencies on the carotene
content of vegetables grown in the greenhouse.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 462-4, bibl. 8.

These trials at Columbus, Ohio, indicate that in leafy vegetables the carotene content is associated with the greenness of the plant, a dark green colour indicates a larger amount of carotene than is found in yellowed plants. Any lack of fertilizer which causes a yellowing of plants also causes a decrease in carotene content. [Authors' summary.]

1674. GERICKE, S. 635.1/7: 631.85
Phosphorsäuredüngung im Gemüsebau. (The
phosphatic manuring of vegetables.)
Gartenbauwiss., 1941, 16: 263-91, from abstract
Forschungsdienst, 1942, Vol. 14, abstr. p. 48.

Extensive trials conducted from 1924 to 1939 in many parts of Germany showed that vegetable yields may be considerably increased by generous applications of P_2O_5 , the most economical amounts per hectare being: 60 kg. for celery, horseradish, asparagus; 120 kg. for kohlrabi, carrots, French beans, tomatoes, parsley; 160 kg. for savoy, kale, runner beans, peas, leeks; and 200 kg. for cabbage, red cabbage, turnips, cucumbers, onions, spinach.

1675. ROSS, A. A. 635.1/7: 631.811.9: 546.27
The need for boron in the nutrition of vegetable crops.
Qd agric. J., 1944, 58: 350-8.
The symptoms of boron deficiency in a number of vegetable crops are described. Trials conducted in the Sunnybank district, Queensland, where the girdle disease of beetroot was prevalent, showed that the application of borax produced a considerable reduction in its incidence although complete control was not achieved. There was no difference in the effect of borax levels varying from 20 to 60 lb. per acre. At Brookfield, where cauliflowers had exhibited boron deficiency symptoms, beetroots were used as an indicator crop and treated with borax. In this case the success was more complete, probably because the soil deficiency was less severe. Applications of 5 lb. per acre were just as efficient as 20 lb. Among various ways of remedying toxic boron accumulation in the soil the growing of tolerant crops is recommended as the most efficient method. The maximum concentrations of borax (in lb. per acre) which can be tolerated are set out in a table for a number of very sensitive, sensitive, tolerant and very tolerant crops.
1676. IVANOFF, S. S. 632.19: 635.1/7
Guttation-salt injury on leaves of cantaloupe, pepper, and onion.
Phytopathology, 1944, 34: 436-7, bibl. 3.
The injuries are described and illustrated. The composition of the guttation-salts is not entirely known, but several common soluble salts are present, in addition to calcium carbonate. Probably non-parasitic burns difficult to account for may be attributed to guttation injury.
1677. PEPPER, B. B. 635.1/7: 632.7
Vegetable insects and their control on commercial plantings.
Circ. N.J. agric. Exp. Stat. 476, 1944, pp. 15.
General information on the control of the more important insect pests of commercial vegetable plantings is presented under the following headings:—Machine adjustment, spray and dust applications, insect control chart, insecticide formulas, mixing dusts on the farm.
1678. RUDKIN, T. S. 635.1/7: 632.954
Destruction of weeds in vegetable seedbeds by the use of a flame-thrower.
Agric. Gaz. N.S.W., 1944, 55: 245-6.
The working of a continuous pressure pneumatic tank flame-thrower, designed by F. W. Brown, Dubbo, N.S.W., and its application for the destruction of weeds in vegetable seed-beds are described. The method used is first to burn over before cultivation, the width of the flame being about 1 ft. After the beds have been made ready for sowing the ground is watered and left for a week, if time permits. The soil is burned again just before sowing and a third time a day or two before the seed is due to emerge. With carrots and parsnips the procedure may be repeated when the roots are about as thick as a pencil. Rhubarb crops suffered no damage from this treatment, the plants shooting again in all three cases within a few days. It is claimed that the use of this flame-thrower is both effective and economical and that the work is carried out easily and quickly.
1679. McLEAN, H. C., WEBER, A. L., AND JOFFE, J. S. 635.1/7: 632.951
Arsenic content of vegetables grown in soils treated with lead arsenate.
J. econ. Ent., 1944, 37: 315-6, being *J. Ser. Pap. N.J. agric. Exp. Stat.*
The highest arsenic content found in vegetables, which had absorbed the poison from a spray residue in the soil, was 2.25 p.p.m., i.e. well under the amount allowed in the U.S.A. As a rule, the arsenic accumulated in the tops of the plants. Injury to sensitive plants can be avoided by deep ploughing, thus removing the arsenic residue from the top few inches of soil where it tends to linger.
1680. BARNES, H. F. 632.64
Discussion on slugs. I. Seasonal activity of slugs.
Ann. appl. Biol., 1944, 31: 160-3, bibl. 3.
THOMAS, D. C.
II. Field sampling for slugs.
Ann. appl. Biol., 1944, 31: 163-4, bibl. 1.
I. By sampling methods which are shown to be reliable on a garden scale the peaks of activity of 5 of the commonest garden slugs have been recorded.
II. The most suitable method of field sampling was found to be metaldehyde bait (5 teaspoonfuls of bran to $\frac{1}{2}$ metaldehyde per trap) covered with black-painted glass disposed at 10-yard intervals over the field, alternate traps being encircled with a ring of ammonium sulphate, which slugs will not cross. The catches were then compared with unbarriered traps on the same night. Metaldehyde bran baits were also useful in estimating the efficiency of slug poisons on a field scale. The method was to broadcast a poison bait on replicated areas leaving other areas as controls. On the 10th night after baiting the meta baits were placed in both treated and untreated plots, the catches being counted next morning, and thus some idea of the efficiency of the poison could be gained. Tested against paris green and bran, metaldehyde and bran was twice as successful as the former, 60 to 90% kill being regularly obtained. The meta bran mixture was at the rate of 1 lb.: 28 lb., but $\frac{1}{2}$ lb.: 28 lb. was almost equally successful.
1681. STONE, M. W. 632.76: 632.944
Dichloropropane-dichloropropylene, a new soil fumigant for wireworms.
J. econ. Ent., 1944, 37: 297-9, bibl. 1.
A mixture of 1-2 dichloropropane and 1-3 dichloropropylene applied as a new soil fumigant proved successful in the control of the root knot nematode of vegetable crops. Lima beans, maize, peas, yams and tomatoes subsequently grown on fumigated soil were not affected by the treatment.
1682. PEPPER, B. B., AND FILMER, R. S. 635.1/7-2.951
A low rotenone content *Derris malaccensis* dust effective against certain vegetable pests.
J. econ. Ent., 1944, 37: 248-52, bibl. 14, being *J. Ser. Pap. N.J. agric. Exp. Stat.*
Considerable amounts of *Derris malaccensis* being stored in the U.S.A., it appeared desirable to determine the relative effectiveness of dusts made from the roots of this species. The results of field tests for the control of the Mexican bean beetle, 3 species of cabbage worms, the potato aphid and the European corn borer showed that *D. malaccensis* containing only traces of rotenone was equal or superior to the 0.5% rotenone or the 0.4% rotenone plus 2% Lethane dusts.
1683. DONOHUE, H. C. 632.944: 632.76
Chloropicrin treatment of bulk potting soil for Japanese beetle control.
J. econ. Ent., 1944, 37: 305.
The standard application of chloropicrin for weed control was found to destroy the larvae of the Japanese beetle in bulk, binned potting soil.
1684. MUMA, M. H., LANGFORD, G. S.; AND CORY, E. N. 632.76
Mineral oils as diluents of the geraniol-eugenol Japanese beetle bait.
J. econ. Ent., 1944, 37: 295-7, bibl. 5.
Tests conducted at the University of Maryland indicate that the standard geraniol-eugenol bait for Japanese beetles may be diluted to 50% with a mixture of equal parts of white mineral and deobase oil without loss of efficiency.

1685. NATTRASS, R. M. 633.491-2.651.3

Note on the control of the root knot nematode.

E. Afr. agric. J., 1944, 10: 43.

Eelworm (*Heterodera marioni*) was cleared from a heavily infested house used for the growing of stock seed potatoes at the Scott Laboratories, Kenya, by the incorporation of large quantities of chopped Napier grass in the soil. The grass was in sections of about 2 inches in length having been passed through a chaff cutter, and was placed in the soil by trenching to a depth of 12-18 inches, the beds being afterwards lightly stirred with a fork to obtain a good mixture. The trenching was done in July 1942, and the bed was kept moist till planting time the following May. Much of the material had not properly decomposed, and the plants produced few tubers and were sickly and chlorotic but there was no eelworm. The house was planted again in September, by which time the grass was fully decomposed, there was no eelworm and a normal crop was lifted in January 1944. The Napier grass could, of course, be replaced by any other herbage which would raise the organic matter content in the soil.

1686. MAKAROVA, N. A. 633.52-1.8: 581.45

Scientific notes—Changes in the leaf structure of flax as a result of excluding certain mineral elements from the nutrient solution. [Russian.] *Sovetsk. Botan.*, 1943, No. 4, pp. 56-62.

It has been the opinion of Maximov and others that among the indications of xeromorphism in plants, a diminution in size of the leaf epidermal cells, an increase in the number, and a decrease in the size of the stomata, and a more pronounced venation of the leaves are the most noteworthy. These characters can be made to appear by the addition of certain nutrient elements and the exclusion of others. In the experiments described in the present article it was found, in general, that P, B and Mn intensified the xeromorphic characters, but K and Fe diminished them.

1687. ADAM, D. B., AND PIPER, C. S. 633.52-2.19: 546.47

The use of zinc for flax. A progress report for growers.

J. Dep. Agric. S. Aust., 1944, 47: 422-6.

The account by members of the Waite Agricultural Research Institute, Adelaide, deals briefly with a die-back of flax, generally associated with a particular type of soil and reducible by the use of fertilizers containing zinc.

1688. FLOR, H. H. 633.52-2.4

Relation of rust damage [*Melampsora lini*] in seed flax to seed size, oil content, and iodine value of oil. *Phytopathology*, 1944, 34: 348-9, bibl. 4.

Rust reduces yield of seed but not the iodine number of the oil, as would be the case if the crop were affected by drought or high temperatures.

1689. BLACK, M. A. 633.52-2.51

A selective weed killer for controlling weeds in linen flax.

N.Z. J. Sci. Tech., 1944, 25, Sec. A, pp. 235-41, bibl. 3.

In preliminary trials conducted at the Plant Research Bureau, Lincoln, N.Z., spraying with a 2% Sinox solution at the rate of 100 gal. per acre was found to give complete control of the two most troublesome weeds of linen flax, namely fat hen (*Chenopodium album*) and wire weed (*Polygonum aviculare*). Sinox is described as an aqueous paste of the sodium salt of dinitro-ortho-cresol (D.N.O.C.), containing 30% by weight of D.N.O.C. The treatment was applied when the flax was about 4-5 in. high and the weeds had not more than 4-6 true leaves. The optimum concentrations and volume of spray, however, as well as the most favourable time of application still remain to be determined. Since the solution has no residual toxic effect on the soil repeated treatments may be required in badly infested areas to destroy the subsequently germinating weeds.

The commercial possibilities of Sinox in New Zealand cannot be assessed until an estimate of the cost has been made. Small-scale trials with some other crops and weeds seem to indicate that the chemical may have a wider range of application.

1690. NELSON, C. H. 633.522-1.436

Growth responses of hemp to differential soil and air temperatures.

Plant Physiol., 1944, 19: 294-309, bibl. 23.

At Missouri Valley College common hemp, *Cannabis sativa*, grown in the greenhouse in quartz gravel cultures, showed maximal elongation and uniformity of stem thickness when grown in a high soil and air temperature (30° C.). The aggregate dry weight yield was approximately doubled by a combination of cool air (15° C.) and warm substrate (30° C.). The great importance of the edaphic as opposed to air temperature in the structural and nutritional ontogeny of hemp is shown.

1691. BECKER, A. 633.522-1.83

Kalidüngungsversuche zu Hanf. (Potash fertilizer trials with hemp.)

Faserforsch., 1942, 16: 39-42, from abstract *Erndhr. Pfl.*, 1943, 39: 9-10.

Extensive fertilizer trials showed that generous applications of potash were beneficial to hemp grown on moor soils in Germany. The application of 160 kg. K₂O per hectare resulted in an increase in yield of about 30% as compared with the controls. Further trials indicated that an early application of the fertilizer is desirable, although the exact timing remains to be determined.

1692. ULBRICHT, H. 633.524.3

Anatomische Untersuchungen an Malvaceenfasern im Hinblick auf ihre Bedeutung für die Sackfaserzeugung. (Anatomical investigations on Malvaceae fibres in regard to sack fibre production.)

Faserforsch., 1943, 16: 49-81, from abstract *Gartenbauwiss.*, 1944, Vol. 18, abstr. p. 39.

The claim is made, substantiated by investigations at the Botanical Garden at Dresden, that the fibres of several *Abutilon*, *Hibiscus* and *Urena* species could act as a complete substitute for jute. The application of potash magnesia and harvesting before flowering are reported to be necessary cultural measures for the production of good quality fibres.

1693. DE OLIVEIRA, A. C. 633.524.3

Papoula de São Francisco. (Cultivation and processing of *Hibiscus cannabinus* L. in São Paulo, Brazil.)

Bol. Minist. Agric. Rio de J., 1942, 31: 1-10.

An account illustrated by many photographs of the cultivation and after treatment on a fairly large scale of the fibre plant *Hibiscus cannabinus* in São Paulo, Brazil.

1694. PAIXÃO, J. DA C. 633.525.1

A ramie e as outras fibras. (Ramie and other fibres.)

Rev. Agric. S. Paulo, 1944, 19: 148-52.

A comparison between ramie and a number of other fibres grown in Brazil. The cultivation aspect is not included.

1695. HIRST, C. T., AND GREAVES, J. E. 633.63-631.84

Noxious nitrogen in leaves, crowns, and beets of sugar beet plants grown with various fertilizers. *Soil Sci.*, 1944, 57: 417-24, bibl. 12.

The percentage of noxious nitrogen (as lysine, glutamine, arginine, asparagine and betaine) in sugar beet at Utah State Agricultural College was found to vary with the plant section. It is highest in the leaves, lowest in the beet and intermediate in the crown. There were indications that fertilizers increase the noxious nitrogen in all parts of the plant. A considerable portion of the noxious nitrogen was betaine, giving the beet products special value as feed for

pigs, beef, sheep and poultry, but also giving rise to off-flavours in the milk if fed to cows. In the manufacture of sugar noxious nitrogen interferes with crystallization and renders the molasses unfit for human consumption.

1696. RAPIN, J. 633.71
Le rôle de la culture du tabac dans la vallée de la Broye dans l'intensification de la production agricole. (The significance of the tobacco production in the Broye valley for the intensification of agriculture.)
Ber. Schweiz. bot. Ges., 1943, 53A: 116-23.

The growing of tobacco by small holders in the Broye valley, Switzerland, has been established since 1719. During the last 15 years much has been done, particularly as the result of the interest taken by the Research Station, Mont-Calme, Lausanne, to improve the quality of the product. A crisis of the industry in the twenties of this century made it necessary to limit production to about 8,000 quintals* which are grown on approximately 380 hectares. Far from being considered as a dispensable luxury under present war conditions it has been realized that the intensive care given to the tobacco during the few months it occupies the land benefits the other crops grown in rotation for the rest of the year, such as forage crops, early potatoes, rape and autumn sown barley. The breeding efforts of the Mont-Calme Research Station have produced a variety, Mont-Calme Brun, which is well adapted to local conditions. It is hoped that further work will succeed in shortening the ripening period by another few days. Transplanting may be done at the end of May, but it is a frequent practice to delay planting out for the sake of the first crop and to transplant twice. Tobacco requires a generous application of stable manure, which may—if necessary—be partly replaced by compost. In the case of forage crops, potatoes and rape the manure can be applied to the preceding crop. The period of growth in the field should be stimulated by a nitrogenous fertilizer in the form of a nitrate (not exceeding 30 kg. N per hectare), and 150 kg. of potassium per hectare in the form of sulphate should also be applied.

1697. BOWEN, C. V., AND BARTHEL, W. F. 633.71: 581.192

Classification of tobacco. Nicotine-nornicotine method.

Industr. Engng Chem. (Industrial Edition), 1944, 36: 475-7, bibl. 4.

The melting points of the picrates of known mixtures of nicotine and nornicotine indicate that the melting point of the steam-volatile alkaloid picrate may be used as a means of classifying tobaccos as to alkaloidal type. According to the upper limit of the melting point spread, the tobacco is classified as nicotine type (melting point above 211° C.), mixed nicotine-nornicotine type (melting point 198-211° C.), and nornicotine type (melting point below 198° C.). Six tobaccos of known nicotine and nornicotine content were tested for melting point of mixed picrates, and they were found to agree with the classification. [Authors' summary.] The investigation was conducted at the Bureau of Entomology and Plant Quarantine, Beltsville, Md.

1698. ANTILL, R. N. 633.71-1.531

Notes on tobacco seed selection.

Nyasaland agric. Quart. J., 1944, 4: 18-22.

Ten characteristics are noted on which selection of tobacco plants for seed should be based and the preparation of seed heads and their harvesting is described. A 1:1,000 silver nitrate solution is recommended for seed disinfection.

1699. MOSS, E. G., AND BULLOCK, J. F. 633.71
Two new varieties of flue-cured tobacco, 400 and 401.

Bull. N.C. agric. Exp. Stat. 337, 1942, pp. 8.

No. 400 is a new variety of flue-cured tobacco raised at the Agricultural Experiment Station of the North Carolina

* 1 quintal=100 kg. or 220 lb.

State College, which is highly resistant to black root rot (*Thielaviopsis*). The quality of the tobacco is reported to be good, but the leaf appeared to be rather too thin for the requirements of eastern North Carolina and South Carolina. Continuing the breeding work a new variety was produced by crossing No. 400 with Cash. The result is No. 401 which combines the desirable characteristics of both parents but is only partly resistant to black root rot.

1700. ASKEW, H. O., AND BLICK, R. T. J. 633.71: 581.192

The nutrient status of flue-cured tobacco.

N.Z. J. Sci. Tech., 1944, 25, Sec. B, pp. 210-23.

Growth and composition of the tobacco variety Harrison's Special, used for kiln-curing in Nelson, was studied for two seasons at the Cawthron Institute. Whilst the plants did not make much growth during the first 6 weeks after setting out in the field, two-thirds of the dry matter, accumulated in them at their maximum size, was produced from the 7th to the 10th week, which coincided with the period of maximum intake of nutrients. As a consequence of this observation the authors suggest that it might be advisable to delay top-dressing to 4 or 5 weeks after planting. The dry matter production per day and acre, on the basis of 6,000 plants per acre, during the peak period between 22 and 28 January was found to be 114 lb., of which 69 lb. was recorded in the leaves and 45 lb. in the stalks. A further considerable increase in dry matter, amounting to 27% of the total, was noted during the harvesting period, but the absorption of the nutrients during the same period represented a higher percentage of the total seasonal intake ($K_2O=24\%$, $CaO=30\%$, $N=32\%$, $P_2O_5=34\%$, $MgO=35\%$). Figures are given for the amounts of nutrients remaining in the unharvested leaves and stalks at the end of the season and it is concluded that ploughing in the plants as soon as possible after harvesting has much in its favour. Data of leaf and stalk composition at different stages are shown graphically and in tables.

1701. VAN DER PLANK, J. E. 633.71-2.8
Krombek disease of tobacco. A promising

method of control.

Fmg S. Afr., 1944, 19: 391-4.

Krombek disease is the cause of heavy losses to tobacco growers in Transvaal, particularly in the Brits district. The clue to a successful method of control has now been provided by the observation that the vector, a species of thrips, is incapable both of multiplying on tobacco and of moving from one plant to another. Hence, increasing the number of plants by planting in pairs was found to reduce gaps in the stand from 26.1% to 2.9%. The advantage achieved is even greater than indicated by these figures, as a broken stand has a deleterious effect on leaf quality. Overcrowding can be remedied by thinning out if necessary.

1702. SMITH, K. M., AND MARKHAM, R. 632.8: 633.71

Two new viruses affecting tobacco and other plants.

Phytopathology, 1944, 34: 324-29, bibl. 2.

Two new viruses affecting tobacco and *Arabis hirsuta* are described from the Plant Virus Research Station, Cambridge, England. These viruses appeared mysteriously inside insect-proof glasshouses. They appear to be very uninfec-tious and would have been lost, had they not been carefully propagated by mechanical means. The paper is concerned with investigations of their properties.

1703. KASSANIS, B., AND KLECZKOWSKI, A. 632.8: 633.71

The effect of formaldehyde and mercuric chloride on tobacco mosaic virus.

Biochem. J., 1944, 38: 20-4, bibl. 17.

Experiments conducted at Rothamsted showed that 2% formaldehyde at pH values 3-7.5 and a sufficient concentration of mercuric chloride at pH values greater than 6

inactivated tobacco mosaic virus. The mercuric chloride caused loss of serological activity as well. Although it has been claimed that inactivated virus can regain its infectivity all attempts of the authors to reactivate inactivated preparations failed. A number of other reactions are discussed.

1704. KOTTE, W. 633.71-2.4
Die Wildfeuerkrankheit des Tabaks in Deutschland. (The wildfire disease of tobacco in Germany.)
Acta Nicotiana, (undated), pp. 401-4, from abstract *Ernähr. Pfl.*,* 1943, 39: 24.

Control measures of wildfire are discussed which is described as the most important tobacco disease in Germany.

1705. GILMORE, J. U., AND LEVIN, C. 633.71-2.76
Control of the tobacco flea beetle by cultural practices in plant beds.
J. econ. Ent., 1944, 37: 13-5, bibl. 2.

Tobacco seed beds after the crop has been transplanted remain prolific sources of flea beetle populations (*Epidrix parvula*). The potential population can be greatly reduced by pulling the unwanted plants and hoeing, or by ploughing and harrowing.

1706. GRAYSON, J. M. 633.71-2.76
Seedbed and field experiments to control tobacco flea beetles.
J. econ. Ent., 1944, 37: 224-30, bibl. 12.

Experiments, conducted at the Virginia Agricultural Experiment Station, Blacksburg, with a view to determining the sodium fluoaluminate content necessary in a dust for the control of the flea beetle (*Epidrix hirtipennis*) in tobacco seed beds showed that there was no significant difference in results from 90, 70 and 50% dilutions and a 1: 5 paris green-lead arsenate mixture. In a test of relative effectiveness it was found that undiluted basic copper arsenate was not significantly better than 90% sodium aluminate, though it was superior to the average of the 4 above-mentioned treatments. Basic copper arsenate spray, basic copper arsenate dust, and sodium fluoaluminate dust proved equally effective in field experiments, while D.N.Dust D-4 and Genicide failed to give satisfactory results.

1707. CHAMBERLIN, F. S. 633.71-2.76
Control of the vegetable weevil in tobacco plant beds.
J. econ. Ent., 1944, 37: 293-4, bibl. 1.

Both a spray mixture of 2-3 lb. lead arsenate per 100 gal. of water applied 3-4 times at the rate of about 3 gal. per 100 square yards and lead arsenate mixed with a suitable carrier and used as a dust were found to give satisfactory control of the vegetable weevil, *Listroderes obliquus*, which has started to cause damage in tobacco plant beds of the Florida-Georgia area. Lead arsenate may safely be incorporated in the standard fungicidal sprays or dusts for the control of *Peronospora tabacina*.

1708. BEARD, F. H. 633.79-1.534/535
Intensive methods for the propagation of hops: a plea for special hop nurseries.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 112-4, bibl. 1.

The urgent need of the British hop industry at present is a supply of healthy material for the replacement of gardens grubbed owing to the ravages of disease. The author stresses the desirability of filling this need by propagation from relatively small areas of parent plants. He describes propagation of hops by layering and discusses that by softwood cuttings, comparing their respective merits.

* Readers may care to note that after this number, Bd 39, Hft 3/4, this journal will cease to appear until further notice.

1709. BEARD, F. H. 633.79-1.535
Propagation trials with hops. I. The effect of treating cuttings (strap-cuts) with a growth substance before planting.
A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 68-70, bibl. 4.

Two seasons' experiments in which strap-cut cuttings of 3 varieties of hop were treated for 22 hours with α -naphthaleneacetic acid, 20 p.p.m., before planting in randomized plots of 25 and otherwise being treated in an ordinary way show that there is varietal difference in ease of propagation. They also indicate that, until more is known on this point, treatment with growth substance cannot be recommended, as it may in some cases actually lead to a reduction in number of plants produced.

1710. SMITH, K. M., AND MARKHAM, R. 633.8-2.8
A virus disease of lovage (*Ligusticum scoticum*).
Phytopathology, 1944, 34: 335-40.

An undescribed virus producing a very severe necrotic disease when inoculated into tobacco has been obtained from a plant of lovage growing in a private garden and has been studied at the Plant Virus Research Station, Cambridge, England. Although 100% infection can be obtained with tobacco it proved extremely difficult to infect young lovage plants, in fact in only one instance out of 100 attempts did a lovage plant become infected. The host range is wide, and includes tomato which proved to be a symptomless carrier. No insect vector has been found. The infectivity of juice from diseased plants is low. It is inactivated by 10-minute exposure to 60° C.

1711. CHOWDHURY, S. 633.841-2.4
A sclerotial disease of black pepper.
Ind. J. agric. Sci., 1943, 13: 566.

In a number of villages in Assam a serious wilt of black pepper (*Piper nigrum*) was observed, the mortality varying from 17 to 67.2%. *Sclerotium rolfsii*, recorded for the first time in India, was identified as the causal organism.

1712. COCHRAN, H. L. 633.842-1.531
Effect of stage of fruit maturity at time of harvest and method of drying on the germination of pimiento seed.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 229-34, bibl. 5.

At Georgia Experiment Station the most favourable time for harvesting pimiento seed is between the 50-60 day-old stages, when the fruits are a bright deep red colour. Mature green (30 day) and red and green streaked (40 day) fruits, if gathered before frost, can be room-ripened and the seed will give good germination. Sun drying for one or two days has no significant effect on germination.

1713. GUPTA, J. C. S., AND SEN, N. K. 633.844
Studies on the physiology of mustard.
Curr. Sci., 1944, 13: 160-1, bibl. 2.

Three physiological experiments on the development of mustard plants with reference to time of flowering and fruiting were carried out at Presidency College, Calcutta, with the varieties Tori No. 7 and Rai No. 5. (1) Sowings of two varieties, Tori and Rai, were made from 1 September, 1943, to 15 November, 1943 at intervals of 15 days. A gradual shortening of the vegetative period from 46 to 27 days was recorded from the first to the fourth sowing, the figures for the last 3 sowings remaining more or less constant. (2) Only the variety Rai responded to photoperiodic treatment, shortening of the light period prolonging the vegetative phase. A comparison of two sets of experiments with the same photoperiod showed that a decrease in temperature shortens the vegetative phase, which would account for the results obtained with late sowings. (3) Vernalization studies did not give significant results in either of the varieties.

1714. ETCHECOPAR, J. A. 633.85: 581.145
La biología floral del girasol y su relación con la técnica del mejoramiento. (The floral biology of sunflower and its bearing on the technique employed in artificial hybridization.) [English summary.]
Rev. argent. Agron., 1944, 11: 11-9, bibl. 3.

A suitable technique to employ in cross pollinating the sunflower has been worked out at the Estación Experimental de Pergamino, Buenos Aires Province, and is described.

1715. EATON, S. V. 633.85-1.8
Effects of variation in nutrient solution on growth of sunflower plant.
Bot. Gaz., 1944, 105: 425-35, bibl. 22, being *Contr. Hull. bot. Lab.* 559.

The effects of the nutrient solution IR_2S_4 of the Livingstone triangle and 5 other solutions upon the growth of sunflowers were compared at the University of Chicago. The best results were obtained with solution 5, evolved by Hoagland and Arnon, of the following molar concentration: $0.00500 \text{ Ca}(\text{NO}_3)_2$, $0.00100 \text{ KH}_2\text{PO}_4$, 0.00200 MgSO_4 , 0.0050 KNO_3 ; approximate osmotic pressure: 0.7 atm ; pH of drip: $9.71-7.92$; equal amounts of trace elements were added to all 6 solutions. Detailed data of all tests are given and reasons are suggested for the superiority of solution 5.

1716. MOHAMMAD, A., AND AHMAD, S. 581.192: 633.85
Carbohydrate metabolism in some oleiferous Brassicae.
Ind. J. agric. Sci., 1943, 13: 468-70, bibl. 5.

The part played by carbohydrates in the synthesis of fats in some oil-producing Brassicae, toria (*B. napus* var. *dichotoma*) and sarson (*B. campestris* var. *sarson*) was studied at Lylalpur under the Oilseeds Research Scheme in the Punjab. The content of total carbohydrates in the ovules was found to increase during the first 20 days of seed development and to decrease during the following 20 days, for instance the percentage of total carbohydrates expressed on a dry basis (average of 2 years) in the developing ovules at the age of 40 days in toria and sarson is reduced to 10.44 and 10.28 from 32.20 and 40.94 in 20 days old seed respectively. The fats showed the exactly opposite behaviour, the major portion of the oil being formed during the period 20-40 days after flowering. The reducing sugars are the first to undergo change followed by the acid-hydrolysable carbohydrates. A similar change is exhibited by the non-reducing sugars which are present in much smaller quantities. Whilst the total carbohydrates remain practically constant in the leaves, the maximum carbohydrate content of the stem occurs at the blooming period and decreases as the plant grows to its normal height. Full data are presented in two tables.

1717. HUM, T. Y., AND PRATT, R. 633.879
The Hottentot fig, *Mesembryanthemum edule*, as a commercial source of tannin.
Plant Physiol., 1944, 19: 384-6, bibl. 1.

Mesembryanthemum edule is potentially a good commercial source of tannins of the catechol and phlobotannin type. The tannin could be used in the manufacture of leathers without bloom and also usefully in conjunction with other leather materials. The great astringency and mild antiseptic properties of the sap may prove a useful therapeutic combination.

1718. GROSSHEIM, A. A. 633.88
The work of the Botanical Institute of the Azerbaïdjan branch of the Academy of Sciences of the U.S.S.R. during the war. [Russian.]
Sovetsk. Botan., 1943, No. 3, pp. 49-52.

The present and proposed activities of the Institute are very briefly described. The chief aim is the collection of plants

of medicinal, pharmacological and manufacturing value; the finding of substitutes for some of those usually employed for such purposes; and the propagation of useful species. It was found, for example, that *Adonis vernalis*, which does not grow in Azerbaïdjan, could be replaced by *Adonis aestivalis*, *A. bienerstii*, and *A. flammens*. Similarly, *Digitalis purpurea* could be replaced by *D. ferruginea* and *D. nervosa*. Imported *Polygala* could find a substitute in *P. anatolica* which contains senegin in the roots. *Valeriana alliarifolia* could be used instead of the usual pharmacological species. Sources of ethereal oils are to be found in *Juniperus polycarpus* and *J. foetidissima*, and of vitamins, in lucerne, the fig tree, and licorice. A method of extracting vitamins from vine leaves has been worked out. Some attention was given to propagating potatoes by means of the sprouts. Since these need not be set vertically, it may prove possible to plant them by means of a drill. The sprouts retain their vitality for at least two weeks. For summer planting it is necessary to overcome the dormancy of newly lifted tubers of early varieties. Though this has not yet been definitely accomplished, some of the investigations have led to promising results.

1719. BREWER, W. R., AND LAURIE, A. 633.88
Culture studies of the drug plant *Atropa belladonna*.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 511-7, bibl. 1.

Trials at Columbus, Ohio, throw light on cultural methods most conducive to satisfactory returns from belladonna.

1720. MIDDLETON, J. T. 633.88-2.411
Phytophthora rot of belladonna.
Reprinted from *Bull. Torrey Bot. Club*, 1944, 70: 244-5, bibl. 8.

Apparently this is the first detailed account of a *Phytophthora* rot of belladonna (*Atropa belladonna*) from U.S.A. The causal organism is *P. parasitica* and the disease affects roots, crowns, stems and, to a lesser extent, leaves in California. Control can be obtained by planting on light, well-drained soil and by the use of furrow and not overhead irrigation. Spraying with bordeaux, burgundy or cuprous oxide will check the spread. The disease was studied at Riverside Experiment Station, California.

1721. TURNER, C. 633.913
Notes on American rubber production.
J. roy. hort. Soc., 1944, 69: 228-30.

A short account of the history and cultivation of guayule, *Parthenium argentatum*, in U.S.A. Increase being possible only by seed, the collection thereof is a considerable undertaking. A mechanical collector has been devised which sucks the seed off the growing plants into containers. After collection the seed is soaked for 20 hours in water to remove the chaff. The water is then poured off and the bath refilled with $\frac{1}{2}$ to $1\frac{1}{2}\%$ solution of calcium hypochlorite, in which the seed is soaked for 3 or 4 hours, before being again washed. The seed is dried mechanically and packed in air-tight drums till required. It will keep for some years and can be pre-germinated if necessary. Seed bed preparation and sowing are done mechanically and weeding is by means of oil sprays. Transplanting is by means of tractor-drawn machines, planting 4 rows simultaneously, at the rate of 10,000 plants per hour or 10 acres in a 10-hourly day. Harvesting is done by machinery, and there is a 3-day curing period before baling.

1722. SMITH, P. F. 633.913-1.535
Rooting of guayule stem cuttings in aerated water.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 527-8, bibl. 1.

In trials with over 10,000 guayule cuttings each in sand and aerated water 91.2% rooted in water, 52.8% in sand. Plants rooted in water readily established themselves in sandy and clayey loams under glasshouse conditions.

1723. MCRARY, W. L., AND TRAUB, H. P.

633.913: 581.192

Fructosan, a reserve carbohydrate in guayule, *Parthenium argentatum* Gray. *Science*, 1944, 99: 435-6.

In the course of investigations on the carbohydrate metabolism of the rubber-producing plant guayule, indirect evidence was obtained of the presence of a polysaccharide in the stem and roots having the properties of a fructosan. The content ranged from 0.2 to 12%, dry weight basis, depending on the conditions under which the plant was grown. The method of extraction and testing is briefly described. Evidence that this polysaccharide is the chief storage carbohydrate in this species is to be presented in detail elsewhere.

1724. BALANDIN, D. A., AND KOLESNIKOV, B. P.

633.917: 581.192

The content of guttapercha in the species of *Euonymus* in the Maritime Province. [Russian.] *Sovetskaja Botanika*, 1943, No. 4, pp. 42-54.

The five species found growing in the Province and examined in this article are:—*Euonymus alata* Thunb., *E. pauciflora* Maxim., *E. macroptera* Rupr., *E. sachalinensis* Maxim., and *E. maackii* Rupr. *E. pauciflora* and *E. macroptera* are the most widely distributed, while the occurrence of *E. sachalinensis* and *E. maackii* is the most restricted of all the five species, each of which, moreover, is confined to its own altitude. Guttapercha is found in largest amount in *E. maackii*, which is equal in this respect to *E. verrucosa*, a species from which most of the guttapercha in other parts of the U.S.S.R. has been obtained hitherto. *E. alata* is also fairly rich in this substance; but the content of it in the other species does not amount to much. The species, such as *E. maackii*, whose habitat is in light and dry places, contain more guttapercha than those, such as *E. macroptera*, which grow in parts where the degree of moisture in the atmosphere is consistently high, and the situation shaded. Relationship between the species is not a sure guide in the determination of guttapercha content. *E. pauciflora*, for example, though more closely related to *E. verrucosa* than is *E. maackii*, contains much less guttapercha than the latter. Analysis showed that in *E. pauciflora* and *E. maackii* the quantity of guttapercha in the roots was at its maximum in spring and autumn, before and after flowering. This has already been found to be the case in the European species. If the roots are kept in storage, the content of guttapercha may diminish unless the necessary precautions are taken.

1725. PERVUHINA, N. V.

633.94: 581.144.2

Scientific notes—Structural changes in the roots of the resin-bearing *Ferula pyramidata*. [Russian.] *Sovetsk. Botan.*, 1943, No. 4, pp. 62-4.

Ferula pyramidata contains a resin in its roots from which phenols can be obtained. In addition, the foliage provides a nutritive fodder. The problem of storing the roots has been simplified by the discovery that their decay facilitates the extraction of the resin. The different kinds of cells in the root are described, and drawings of two microscopic sections supplement the text.

1726. SAYRE, C. B., AND SHAFER, J. I.

635.11: 631.811.5+631.811.1

Effect of side dressings of different sodium and potassium salts on yield of beets. *Proc. Amer. Soc. hort. Sci. for 1944*, 1944, 44: 453-6, bibl. 10.

Sodium supplemented by nitrogen supplied a definite nutrient need of the beets. The application of nitrogen without sodium was unsuccessful.

1727. TOOLE, E. H., AND OTHERS. 635.11: 631.531

The influence of temperature and duration of storage of roots on reproduction of table beet. *Proc. Amer. Soc. hort. Sci. for 1944*, 1944, 44: 445-7, bibl. 5.

Temperatures of 45° to 50° F. will condition stored roots of table beet for reproduction more quickly than lower temperatures (44° or 33° F.); and more completely, if the period of storage is 2 or 3 months.

1728. AYERS, G. W.

632.411: 635.126

Studies on the life history of the clubroot organism, *Plasmodiophora brassicae*. *Canad. J. Res.*, 1944, 22, Sec. C, pp. 143-9, bibl. 7.

These studies by the Division of Botany and Plant Pathology, Ottawa, were confined to the life history of the organism in root hairs of the swede turnip.

1729. WOODBURY, G. W., AND SCHULTZ, H. K.

635.13: 631.521

Crown division of roots as an adjunct to carrot breeding and seed production studies. *Proc. Amer. Soc. hort. Sci. for 1944*, 1944, 44: 488-90.

By dividing carrot roots into two or more parts it was possible to produce several genetically equal plants, which could be isolated to fit a number of types of breeding programmes.

1730. HARRIS, G. H.

631.811: 635.13+635.12

Some effects of micro-elements on growth and storage of carrots and turnips. *Proc. Amer. Soc. hort. Sci. for 1943*, 1943, 43: 219-24, bibl. 10.

Application of minor elements, boron, copper, manganese and zinc to carrots and turnips in the Fraser Valley, British Columbia, gave changed responses in yield, sugar content and storage values, although there was no visible evidence in the crops of minor element deficiency. The effect of the minor elements varied with the soil type and with the crop. For instance, with carrots on peaty soil, boron, copper and especially zinc increased yield and size of roots in relation to tops, and all the elements used decreased sugar content and dry weight. Boron, manganese and zinc increased keeping quality. In clay boron notably increased root weight in relation to tops, whereas in sandy loam copper and manganese were the effective elements in this respect. With turnips, manganese and zinc increased yield on clay and boron and copper depressed it. In light sandy soil all the elements tended to depress yield. In clay all the minor elements increased storage quality of turnips, especially boron and zinc, in sandy loam they had no effect. A number of other results are also tabulated.

1731. ARK, P. A., AND GARDNER, M. W. 635.13: 632.3

Carrot bacterial blight as it affects the roots. *Phytopathology*, 1944, 34: 416-20, bibl. 4.

Carrot bacterial blight, *Phytophthora carotae*, causes black scabby lesions on the roots. The organism is harboured in the soil. Seedborne infection was controlled by hot-water treatment of the soil, 52° C. for 10 minutes, at Berkeley Research Station, California.

1732. HOOKER, W. J.

635.13: 632.4

Comparative studies of two carrot leaf diseases. *Phytopathology*, 1944, 34: 606-12, bibl. 3.

Experiments conducted at the University of Wisconsin showed that the difference in seasonal cycles of the two causal fungi of leaf spot in carrot is not determined by temperature but by the difference in relative resistance of young and old host leaves. Young carrot leaves were found to be most susceptible to *Cercospora carotae* and comparatively resistant to *Macrosporium carotae*, whilst resistance conditions were reversed in old leaves, the two diseases being

at their peaks in mid-season and in August-September respectively.

1733. BINKLEY, A. M., AND JONES, H. A.

635.25: 631.523

A comparison of Sweet Spanish hybrids with commercial Sweet Spanish onion strains.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 485-7, bibl. 2.

Fort Collins trials show the possibility of producing hybrid onions which are high yielding and uniform in type.

1734. CROXALL, H. E. AND PICKFORD, P. T. H.

635.25: 631.8: 632.4

Manurial experiments on vegetable crops. VI. Effects of farmyard manure and other manurial treatments on yield and storage rots of onions.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 57-61, bibl. 3.

The highest weights of ware onions resulted from treatments in which inorganic nitrogen was used to supplement farmyard manure and compost. A high yield was also given by a complete fertilizer containing hoof. Smaller yields were given by farmyard manure, sludge/town refuse, compost and complete fertilizer plus magnesium sulphate. In the store, however, the highest percentage of rotten onions was found in the farmyard manure plus nitrogen and the complete fertilizer plus magnesium sulphate treated onions. The lowest final percentage of rots was found in the onions on which only farmyard manure had been used. The chief rots were due to *Botrytis allii* and *B. byssoides*.

1735. HAWTHORN, L. R.

635.25-2.13

Simulated hail injury on Yellow Bermuda onions.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 265-71, bibl. 4.

At Texas Experiment Station the yields of large and medium sized onions were reduced by 75.8% by the complete removal of foliage 3-6 weeks before harvest, by 52.4% if removed 2 weeks and by 20.1% if 1 week ahead. Removal of half the foliage at similar periods caused 43.7%, 34.7% and negligible losses respectively.

1736. ROSENE, H. F.

635.25: 581.144.2: 631.841.5

Effect of cyanide on rate of exudation in excised onion roots.

Amer. J. Bot., 1944, 31: 172-4, bibl. 9.

The effect of replacing cyanide-free solutions surrounding onion roots by various low concentrations of molar KCN was to depress the rate of exudation gradually to inhibition level, though in these experiments water transfer never completely ceased. Prompt recovery took place when the .01 M cyanide solution, the highest used, was replaced by tap water after a relatively short period of exposure, but after longer periods of exposure maximum exudation rates failed to appear. Experiments on exudation and oxygen consumption yield evidence that there are gland-like tissues in roots that are actively engaged in water consumption. It may be presumed that the absorptive and oxidative activities of excised onion roots are linked processes, though the action by which cyanide interferes with the transfer of water is not yet known. These studies are in progress at Texas University.

1737. EWART, W. H., WATKINS, T. C., AND ASHDOWN, D.

635.25: 632.72

Insecticidal uses of tartar emetic: against onion thrips in New York.

J. econ. Ent., 1944, 37: 269-76, bibl. 39.

Field and greenhouse investigations on the control of onion thrips with tartar emetic have been in progress at Cornell University, Ithaca, N.Y., since summer 1939, resulting in the recommendation of the following spray schedule: 5-6 applications of tartar emetic-sugar-water (2-4-100) spray at the rate of at least 125 gal. per acre and a pressure of 150 lb. The treatment should begin when the onions are 4-6 in. high, and be repeated at about 6-day intervals. This

programme involves spraying early in the season before the severity of the thrips infestation and the necessity of treatment can be assessed. The adoption of the schedule should therefore be regarded as an economically sound insurance.

1738. HICKMAN, C. J.

632.411: 635.25 + 635.263

Shanking of onion and shallot associated with species of *Phytophthora*.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 100-2, bibl. 4.

A consideration of the incidence of shanking of onion and shallot indicates that the infection is probably soil borne. Hence the soil used for raising plants under glass should be sterilized. How the infection reaches field drilled crops is not known.

1739. CLORE, W. J.

635.31-1.84

The effect of time of application of nitrogen fertilizers on the yield of asparagus.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 501-5.

There were no significant differences in the total yield of asparagus resulting from time of application of nitrogen in 5 years trials at Prosser, Wash.

1740. EICHMANN, R. D.

635.31: 632.77

Asparagus miner really not a pest.
J. econ. Ent., 1943, 10: 849-52, bibl. 7, being Sci. Pap. St. Coll. Wash. 558.

As the result of a study conducted at the Agricultural Experiment Station, Pullman, the asparagus miner, *Agromyza simplex*, will, in spite of its abundance, no longer be considered an asparagus pest in Washington.

1741. FREY-WYSSLING, A., AND BLANK, F.

635.34: 581.175.11

Untersuchungen über die Physiologie des Anthocyanins in Keimlingen von *Brassica oleracea* L. var. *capitata* L. f. *rubra* (L.). (The physiology of anthocyanin in red cabbage seedlings.)
Ber. schweiz. bot. Ges., 1943, 53A: 550-78, bibl. 58.

The anthocyanin, sugar and nitrogen content of 20-80 mm. long red cabbage seedlings grown in the dark at 10° or 30° C. (germinated at 20° C.) was determined at the Eidgenössische Technische Hochschule, Zürich. It was found that in starved seedlings the anthocyanin content continually decreased at 10° C., while an increase in the first stages and a subsequent decrease was noted at 30° C. The sugar content (water soluble mono-saccharides) showed a persistent decrease at both temperatures, whereas the total nitrogen content remained constant. There was no close relation between the anthocyanin and sugar metabolism. From the fact that anthocyanin may be reabsorbed into the metabolism it is concluded that the pigment is not a final product. Further trials showed that the optimum temperature for the formation of anthocyanin lies between 10° and 30° C. When seeds or seedlings, which were still colourless, were dipped in a watery solution of hydrogen peroxide a red pigment was produced in the vacuoles. If it were established that this pigment is anthocyanin its formation by oxidation from precursors would be proved. The significance of the results is discussed.

1742. ISBELL, C. L.

635.34: 631.535

Propagating cabbage by leaf cuttings.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 491-3, bibl. 4.

Details of several successful methods of propagating cabbage from leaf cuttings are described.

1743. WHITCOMB, W. D.

635.34: 632.77

The cabbage maggot.
Bull. Mass. agric. Exp. Stat. 412, 1944, pp. 28, bibl. 8.

The cabbage maggot is most destructive in the Northern States of U.S.A. and in Canada. Varieties show variation

in susceptibility. The life history of the fly, *Hylemyia brassicae*, is described and the remainder of the bulletin is concerned with control experiments. Seedlings should be covered with 20-30 mesh cheese cloth; or corrosive sublimate, 1 oz. to 15 gal. water, may be applied at intervals of 7 days for 3 weeks, using 1 gal. on 40 to 50 ft. of row. Use 1 oz. in 10 gal. if infestation is heavy. On transplants in the field use 1 oz. in 10 gal. at the rate of half a cupful per plant, making 2 applications at weekly intervals if infestation is heavy, or apply a 4% calomel dust in a mound round the plant, using 1 teaspoonful per plant. Transplants without soil on the roots may have the roots moistened and dusted with 50% calomel talc dust just before transplanting. Other measures are also suggested and their relative value and costs compared.

1744. FULTON, B. B. 635.34: 632.77
The cabbage maggot in North Carolina.
Bull. N.C. agric. Exp. Stat. 325, 1942, pp. 24, bibl. 6.

In North Carolina the cabbage maggot (*Hylemyia ciliicrura*) is injurious only in regions above 3,000 ft. altitude. Mercury insecticides give good protection, but control may also be achieved by cultural practices, for instance late planting.

1745. CROXALL, H. E., AND PICKFORD, P. T. H. 631.8: 635.34 + 635.35
Manurial experiments on vegetable crops. V. Effects of farmyard manure and of various fertiliser treatments on spring cabbage and cauliflower.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 54-6, bibl. 2.

Owing to weather and the ravages of cutworms the only observation possible with regard to cabbage was the very poor growth of the nitrogen-omitted plots. Cauliflower showed a predominant need for nitrogen. Potash did not increase yield but its omission led to deficiency symptoms late in the season. The omission of phosphate probably decreased yield. Yields from muriate of potash and salt plots were high and suggest that chloride-containing fertilizers do not harm cauliflowers.

1746. TIEDJENS, V. A., AND SCHERMERHORN, L. G. 635.41
The growth of spinach on phosphorus deficient soil.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 506-10, bibl. 2.

Preliminary pot trials at New Brunswick, N.J.

1747. SCHROEDER, R. A., AND WITTEW, S. H. 631.811.4 + 631.811.1: 635.1/7
Vegetable crops in relation to soil fertility. 1. Yields of lettuce and spinach as influenced by variable calcium and nitrogen.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 469-71, bibl. 4.

Calcium proved all important for lettuce, but not for spinach.

1748. THOMPSON, R. C. 635.52: 632.8
Reaction of *Lactuca* species to the aster yellows virus under field conditions.
J. agric. Res., 1944, 69: 119-25, bibl. 9.

A very large collection of cultivated lettuce varieties and wild *Lactuca* species were tested extensively in the field at Beltsville, Md, for their susceptibility to the aster yellows virus, to which in some seasons up to 30% of the crop succumb in the eastern parts of the United States. Whereas all cultivated varieties were found to be susceptible, a number of wild species proved fairly resistant. Of the latter particularly two strains of *Lactuca serriola*, but also two forms of *L. saligna*, seem to offer some promise in respect of breeding for resistance.

1749. OGILVIE, L. 635.52: 632.42
Downy mildew of lettuce. A preliminary note on some greenhouse experiments.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 90-4, bibl. 18.

Trials with different varieties of lettuce and the two strains of fungus discovered lead the author to make tentative suggestions for control, which consist in using only varieties found resistant to one of the strains or, if susceptible varieties are used, raising only in sterilized soil, spraying or dusting the seedlings on emergence and generally paying particular attention to cultivation. Details are given.

1750. MCKINNEY, K. B. 635.52: 632.78
The cabbage looper as a pest of lettuce in the Southwest.
Tech. Bull. U.S. Dep. Agric. 846, 1944, pp. 30.

Based on investigations, which were conducted in the Salt River Valley of Arizona under irrigated conditions 1933-8, the biology of the cabbage looper, *Autographa brassicae*, is described and recommendations on its control as a pest of autumn-grown lettuce are given, the spring crop being practically free from injury. Derris dusts proved to be toxic to the pest, but on small lettuce cryolite and paris green were also used with success. In the case of a mixed infestation of loopers and beet army worms calcium arsenate gave the best results. Provided the insecticides were applied 3-5 days before thinning one application at the rate of 10-20 lb. per acre was sufficient.

1751. GANS, L. 635.53: 632.4
Die Sellerie-Blattfleckenkrankheit. (Leaf spot of celery.)
Gartenbauwirtsch., 1941, 58, H.15, p. 4, from abstract *Forschungsdienst*, 1942, Vol. 14, abstr. p. 42.

Recommendations for the control of leaf spot of celery, as worked out at the Plant Protection Station, Munich, and successfully practised in Bavaria, are as follows:—(1) seed treatment in disinfestant solution; (2) sowing not before March, if necessary previous soil sterilization with formaline; (3) repeated treatment of seedlings and young plants in frames with copper dust; (4) planting out in well prepared soil, roughly worked in autumn with horse manure ploughed in—or cow manure may be applied in spring; (5) generous application of K_2O ; (6) hardening the plants in early stages, little watering after planting out; (7) roguing of infected plants and two dustings of an area of 2m² around every infected spot.

1752. WALTON, R. R., AND WHITEHEAD, F. E. 635.61: 632.753
Effects of nicotine dust on the melon aphid and its natural enemies.
J. econ. Ent., 1944, 37: 310-1.

Nicotine dusts were shown to kill a high percentage of the melon aphid population but to have little effect on its enemies, syrphid fly larvae, ladybird beetle larvae and adults, aphid lion larvae and the parasite *Lysiphlebus*. The measure of control achieved with nicotine dusts was therefore complete where the whole plot was treated, whereas reinfestation occurred in partially treated plots.

1753. IVANOFF, S. S. 635.611: 632.4 + 632.753
Resistance of cantaloupes to downy mildew and the melon aphid.
J. Hered., 1944, 35: 35-9, bibl. 2.

Four cantaloupe varieties of West Indian origin have shown resistance to downy mildew (*Peronosplasmopora cubensis*) and to aphids (*Aphis gossypii*) at the Texas Experiment Substation, Winter Haven. These are Smiths Perfect, Green-fleshed Rocky Dew, Orange-fleshed Rocky Dew and Cuban Castilian. The progress of attempts to breed from these a disease- and pest-resistant variety possessing also shipping and other commercial qualities is described.

1754. MIDDLETON, J. T. 635.62: 632.8

Seed transmission of squash-mosaic virus.

Phytopathology, 1944, 34: 405-10, bibl. 10.

The symptoms of the squash-mosaic virus disease are described from the Riverside Citrus Research Station, California, and the virus is shown to be seed transmitted. It remains as viable in 3-year-old as in fresh seed. The disease may be partly controlled by collecting seed from non-infected fields and by planting away from vector-infested breeding grounds. The vectors are the western spotted cucumber beetle *Diabrotica soror*, and the western striped cucumber beetle *D. trivittata* and 5 species of aphids. If seed has to be taken from infested fields the percentage of seed transmission can be greatly reduced by winnowing.

1755. CRAFTS, A. S., AND LORENZ, O. A.

635.62/63: 581.192

Composition of fruits and phloem exudate of cucurbits.

Plant Physiol., 1944, 19: 326-337, bibl. 28.

Evidence is presented to show that the phloem exudate from cucurbits can no longer be considered a true sample of the assimilate stream.

1756. WEBSTER, R. E. 635.627

Comparison of yield between trellis-grown and ground-grown plants of the disrag gourd.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 497-500, bibl. 1.

Trellis-grown plants of *Luffa aegyptiaca* considerably outyielded plants allowed to run on the ground and produced higher quality fruit under Beltsville, Md. conditions.

1757. VAN KOOT, Y. 635.63: 632.48

Enkele onderzoekingen betreffende de *Fusarium*-ziekte bij de komkommer. (*Fusarium diseases of cucumbers*.)

Tijdschr. Plantenz., 1943, 49: 52-72, from abstract *Zbl. Bakt.*, Abt. II, 1943, 106: 232.

The following *Fusarium* species were isolated from diseased cucumbers: *F. solani* var. *martii*, *F. orthoceras*, *F. orthoceras* var. *longius* and *F. angustum*. Inoculations with the isolates produced symptoms identical with those occurring under natural conditions. Successful infections of melons and beans were also carried out with the isolates. In soil disinfection tests chloropicrin and formalin gave the best results.

1758. CORBETT, W., AND HUGHES, H. M. 635.64

Outdoor tomato variety trial, 1943.

A.R. East Malling Res. Stat. for 1943, A27, 1944, pp. 44-6.

Trials of nine varieties of tomato were held at the Glasshouse Demonstration Station, Wilmington, and at East Malling and results are here discussed. There are indications that the most promising—from this one year's trial—are Harbinger, Earliest of All and Market King. Stress is laid on the fact that weather conditions not only affect cropping in general but may also affect the cropping capacity of certain varieties in particular seasons. Plants for open air growing should be strong with a large clean root system. They should not be "hard"; they should show the first truss when planted out.

1759. HALLSWORTH, E. G., AND LEWIS, V. M.

635.64: 577.16

Variation of ascorbic acid in tomatoes.

Nature, 1944, 154: 431-2, bibl. 3.

The results of a study at Sydney University, Australia, of the wide variations in ascorbic acid content found in any one variety of tomato are the subject of a preliminary note. The ascorbic acid content for the fruit of one bush, although showing a considerable constancy in all the fruit ripe at any one time, tends to increase as the plant ages, independently of the length of daylight in which the plant is grown. There is also marked bush to bush variation of the order of 100% (24-51 mg./100 g.), a variation considerably greater

than variation between the mean ascorbic contents of the different varieties grown. The variations are maintained in the seed progeny and this fact should be useful in the building up of high ascorbic strains. Within certain weight limits (under 30 g.) there was a highly significant correlation of weight with ascorbic acid content. This is accounted for by the hypothesis that ascorbic acid is largely synthesized in the fruit by the effects of light rays and thus varies with the amount of light energy received per unit weight of fruit. Thus the smaller tomatoes would tend to have a higher ascorbic acid content since their wide surface area/weight ratio ensures that in them the ratio of light energy received to weight of fruit would be greatest. Applying this hypothesis to other plants, may not the varying surface area/weight relationship be partly responsible for the variation in ascorbic acid content of the different species of *Rosa* previously attributed to genetical influences? The increase of ascorbic acid content in the tetraploid cabbage as compared to the diploid is accompanied by a decline in weight. The same factor may be operating here.

1760. VINCENT, C. L.

635.64

Washington State, a new forcing tomato.

Bull. Wash. agric. Exp. Stat. 436, 1944, pp. 12.

A new forcing tomato, Washington State, has been developed at Pullman by crossing Bonny Best as female parent with Sutton's Best of All. The variety is described as a dependable bearer when properly pollinated, combining good flavour and colour with excellent-keeping quality, smooth skin and attractive appearance. The average number of fruits to the cluster is 7-9. Washington State is not suitable for growing in the open unless pruned, staked and planted in rich soil.

1761. DETJEN, L. R.

635.64: 631.541.11

The influence of the rootstock on seeds and on seedling progenies of tomato grafts.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 147-8, bibl. 1.

Tomato seedlings of Earliana were grafted on *Datura stramonium*, *Nicotiana tabacum*, *Solanum tuberosum* and *Lycopersicon esculentum* by a method in which whole rooted seedlings were used as scions, the roots being inserted up to the crown in a cleft cut in the top of the decapitated stock. Of the self-pollinated seeds taken later from these grafted plants the *Datura*-stock group were the first to germinate and remained the most vigorous throughout, the *Solanum* and *Lycopersicon* came next in order of germination and vigour and the *Nicotiana* group last. The same results were obtained with 3 successive sowings and the author sees in this the effect of stock influence persisting into the succeeding generation.

1762. ROBERTS, R. H., AND STRUCKMEYER, B. E.

577.15.04: 635.64

The use of sprays to set greenhouse tomatoes.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 417-27.

Thoroughly wetting tomato blossoms with water solutions of β -naphthoxyacetic acid (75 mg. per litre) or 2, 4 dichlorophenoxy propionic acid (7.5 mg. per litre) proved a practical method of setting the lower clusters on early and late winter crops of greenhouse tomatoes. Among other incidental points the following may be noted. Fertilization must be prevented, if seedless fruit is desired. Thus early blossoms set with chemicals will develop into seeded fruits if pollinated at the full blossom state. Sprayed fruits showed greenness round the placental area, but otherwise did not differ from pollinated fruits.

1763. WENT, F. W.

635.64: 581.036

Plant growth under controlled conditions. II. Thermoperiodicity in growth and fruiting of the tomato.

Amer. J. Bot., 1944, 31: 135-50, bibl. 37.

In experiments at the California Institute of Technology

the rate of stem elongation and setting of fruit of tomatoes grown in gravel and watered with nutrient solution was extremely uniform as between plants in a given temperature, but alteration of temperature had an immediate effect upon rate of stem elongation. Differences in humidity of the air had only a very passing effect. At a constant temperature of 26-5° C. a steady growth rate of 23 mm./day was reached when the plants were 30 cm. tall and was maintained as long as the plants were trained to a single stem. Plants at lower temperatures had lower growth rates. Plants grown at 26-5° C. by day but in a temperature lowered to 17-20° C. by night showed the most rapid growth, 27 mm./day. The lower temperature was only effective when maintained during the dark period. Fruit set was abundant only when night temperatures were between 15° and 20° C., lower and higher temperatures reduced or inhibited fruit formation. It is suggested that, not only in tomatoes but as a general rule in higher plants, thermoperiodicity is due to predominance of two different processes, at day and at night, of which the dark process has a much lower temperature optimum than the light process.

1764. HAMPSON, E. K. 635.64: 631.8
Growing quality in tomatoes.
Canad. Fd Pkr, 1944, 15: 6: 25, 27, 29.

A discussion of the manurial requirements of tomatoes by the manager for Canada of the American Potash Institute. The emphasis is not unnaturally on potash, but a useful summary of general results obtained in manurial trials is given. The third month is the period when the plants absorb the greatest amount of nutrients. Experiments in which the fertilizer was placed at greater depths than is customary, in order to reach the main root system, gave very good results for the following reasons. Nutrients can still be absorbed by the roots during droughts, greater amounts of fertilizer can be employed without damage, fixation of phosphates is reduced, yield and quality of the fruit have been materially increased over those obtained by conventional methods. Three-fourths of the total amount should be placed at the bottom of the furrow, the remainder at soil level. Surface application should be high in phosphate while that placed deeper should be high in potash and nitrogen and medium in phosphate.

1765. LYON, C. B., AND GARCIA, C. R. 635.64: 631.8
Anatomical responses of tomato stems to variations in the macronutrient cation supply.
Bot. Gaz., 1944, 105: 441-56, bibl. 9.

An inbred strain of Bonny Best tomatoes was grown in sand culture. The effects of 43 nutrient solutions varying in the relative proportions of macronutrient cations (calcium, potassium and magnesium) were studied in relation to the anatomy of plant stems. Measurements of stem diameter and the actual area of each of the component tissue systems were recorded. The data were reduced and analysed by statistical methods. [From authors' summary.]

1766. BEESON, K. C., LYON, C. B., AND BARRENTINE, M. W. 635.64: 631.8
Ionic absorption by tomato plants as correlated with variations in the composition of the nutrient medium.
Plant Physiol., 1944, 19: 258-77, bibl. 19.

With an inbred strain of Bonny Best tomatoes grown in sand culture variations in the relative proportions of macronutrient cations supplied in the nutrient medium resulted in large differences with respect to mineral composition of both fruit and vegetative material. The composition of plant tissue was found to be correlated with the composition of nutrient medium. The concentration of any given element in plant tissue was in many instances not only correlated with the supply of that element alone in the nutrient medium, but also with the supply of other ions.

The correlations found are tabulated. When the relative amounts of leaflet and fruit material produced in each plant were considered, the total uptake of a given element by these tissues showed the same trends as those observed for the concentration of that element in the tissue. The paper was contributed from the U.S. Plant, Soil and Nutrition Laboratory, Ithaca, N.Y. [From authors' summary.]

1767. EMMERT, E. M. 631.8: 635.64+635.65
The effect of "split applications" of nitrogen and phosphorus on the yields of tomatoes and large seeded Lima beans.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 433-40, bibl. 2.

Time of application was proved to be equally important both for nitrogen and for phosphorus.

1768. CLARKE, E. J. 635.64: 631.83
Studies on tomato nutrition—I. The effect of varying concentrations of potassium on the growth and yields of tomato plants.
J. Dep. Agric. Éire, 1944, 41: 53-81, bibl. 13.

Experiments on the effect of potassium upon tomato plants, conducted at University College, Dublin, gave new proof of the essential need of this element and stressed the importance of its availability, from basal dressings, in the early developmental stages. The trials were carried out with the variety Potentate under cold house conditions in a soil low in potassium. The most favourable response to basal dressings was obtained from an application of one ounce of potassium sulphate per plant or 1,000 lb. per acre, with 16,000 plants to the acre. Yields were not improved by higher applications, but an excess of potassium in the plant or in the soil was found to be deleterious. Growers must therefore see to it that potassium does not accumulate in the soil. No additional benefit was derived if top dressings were increased beyond one-eighth of an ounce per plant or 125 lb. per acre. The number of top dressings and the stage at which they should begin remain to be determined. It was shown that both prolonged applications of top dressings and applications at the wrong time may cause considerable delay in fruit ripening. The disorders blotchy ripening and one form of "green back" were found to occur at all levels of potassium and to be associated rather with too little light and with exposure to intense sunshine respectively. The other form of "green back" was caused by excess of potassium. Tables and graphs illustrate the effects of various potassium levels.

1769. BREON, W. S., GILLAM, W. S., AND TENDAM, D. J. 635.64: 631.84/85
Influence of phosphorus supply and the form of available nitrogen on the absorption and the distribution of phosphorus by the tomato plant.
Plant Physiol., 1944, 19: 495-506, bibl. 11.

Tomato plants at Purdue University Experiment Station, Lafayette, Indiana, grown in a medium supplying urea as a source of nitrogen did not develop phosphorus deficiency symptoms as soon as plants receiving nitrate nitrogen. Plants grown at pH 6.8-7.0 showed less delay in the appearance of symptoms than those at pH 4.8-5.0 and those receiving urea at the higher pH made better growth than at pH 4.8-5.0. Plants receiving urea absorbed phosphorus at a greater rate than those receiving nitrate nitrogen. Retarding of the deficiency symptoms in these plants was probably due to their increased phosphorus reserve rather than to a partial breakdown in their nitrate reduction mechanism. Phosphorus-deficient plants absorbed phosphorus at a higher rate than plants already adequately supplied, grown in the same solution. The various phosphorus compounds of the plant were synthesized in about the same proportions by the phosphorus-deficient plant as by the normal plant but at a greater rate.

1770. PARKS, R. Q., LYON, C. B., AND HOOD, S. L.
635.64: 631.811.9: 546.27

Some effects of boron supply on the chemical composition of tomato leaflets.

Plant Physiol., 1944, 19: 404-19, bibl. 55.

A study of the effects of boron supply ranging from deficient to toxic concentrations on the chemical composition of tomato leaflets, was carried out by the U.S. Plant, Soil and Nutrition Laboratory, Ithaca, N.Y. The concentrations of 14 of the essential nutrient elements were used as criteria of chemical composition. Increase of boron supply increased the concentration of this element in the leaves and altered the concentration of some of the other elements by several hundred per cent. The results reported offer a possible explanation of the confusion which exists in the published data. For instance reports of trends involving increased magnesium, calcium or potassium concentrations associated with increased boron supply, and decreased magnesium, calcium or potassium concentrations also associated with increased boron supply could all be supported by these data, if different initial levels of boron supply are assumed. That specific effects of boron exist with respect to different elements was made clear. It is possible that these effects might be used to increase the nutritive value of food plants. An increased protein content resulting from an increased boron supply with little suppression of yield in a forage crop would have profound significance nutritionally.

1771. JONES, J. O., NICHOLAS, D. J. D., AND WALLACE, T.
635.64: 631.811.6: 632.19
Experiments on the control of magnesium deficiency in greenhouse tomatoes. Progress report 1.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 48-53.

Trials in 1942 and 1943, in which the results of injection with 1% magnesium sulphate solution, spraying with 1% solution and the application to the soil of magnesium sulphate were tested, indicate that considerable control of magnesium deficiency in greenhouse tomatoes can be obtained by the addition of 4-8 cwt. per acre of magnesium sulphate (calculated Kieserite 30% MgO) to the basal fertilizer dressing. It may be noted that in the trials results of magnesium sulphate were better in the absence of potassium and that deficiency symptoms were less severe where the soil had been steam sterilized.

1772. JOHNSON, W. A. 631.876.9: 635.64+633.491
The effect of sawdust on the production of tomatoes and fall potatoes and on certain soil factors affecting plant growth.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 407-12, bibl. 8.

Old pine sawdust is available in Alabama. Results of trials show that the effects of sawdust depend (1) on its method of application, i.e. whether as a surface mulch or incorporated, (2) on the lapse of time after application, (3) on the amount of nitrogen applied to the crop. Provided enough nitrogen is added no harmful effects are to be expected.

1773. KRONE, B. P. 635.64: 631.547.6
How to ripen green tomatoes in winter.
J. Dep. Agric. Vict., 1944, 42: 356-7, 364.

The necessity of saving the seed of a tomato crop planted late in the season led to the development of a design for a ripening room in which green tomatoes can be ripened in Victoria during the winter. It was found that light and a minimum temperature of 60° F. are essential conditions and that ventilation is very valuable in that it permits the temperature to be increased up to 75° and thus the ripening process to be hastened. The ripening room suggested on the basis of these observations is of the skillion type, 15 ft. long, 10 ft. wide and 8 and 9-6 ft. high at front and rear respectively. The roof and the top two feet of the walls—excluding the back wall—should be of glass. Heating can

be provided cheaply and efficiently by the installation of a few 6 ft. lengths of 4 in. flue piping and a small kerosene stove. Details of construction are given. Tests have shown (1) that tomatoes which take longer than a fortnight to ripen have a tendency to soften, (2) that in the absence of glass electric light may be used and (3) that a certain dropping of the temperature at night reduces the rate of ripening only slightly.

1774. BERKELEY, G. H., AND RICHARDSON, J. K.
635.64: 632.3/4+632.8

Tomato diseases.

Publ. Dep. Agric. Canada 759 (Fmrs' Bull. 122), 1944, pp. 18.

An account, for growers, of the various diseases to which the tomato is liable in Canada and of their control.

1775. ARK, P. A. 635.64: 632.3
Studies on bacterial canker of tomato.

Phytopathology, 1944, 34: 394-400, bibl. 12.

Phytophthora michiganensis and its variants were studied at the University of California. The variants are less pathogenic to tomato than the normal strain and their reactions in media are different. Infection was not transmitted by *Myzus persicae*, *Lygus pratensis*, *Thrips tabaci*, *Heliethrips fasciatus* or *Diabrotica duodecimpunctata*, but was easily spread by knife cuts and to a less extent by punctures.

1776. RICHARDSON, J. K., AND BERKELEY, G. H.
635.64: 632.4

Basal rot of tomato.

Phytopathology, 1944, 34: 615-21.

A hitherto unreported basal rot of greenhouse tomato, caused by an unidentified fungus has been found in the vicinity of London, Ontario. Isolations and inoculations have proved the pathogenicity of the causal organism. The symptoms of the disease, consisting of defoliation of the lower leaves and a cortical rot of stalk and roots, and a description of the pathogen are given in detail. The disease, which may reduce yield as much as 50%, can be controlled by soil sterilization with steam, chloropicrin, or formalin. [Authors' summary.]

1777. THOMAS, H. R. 635.64: 632.4
"Freckle" a spotting of tomato fruits.

Phytopathology, 1944, 34: 341-4, bibl. 4.

A superficial spotting and blemish of ripe tomato fruits in Indiana, referred to locally as freckle, is attributed to an infection by *Alternaria solani* or *A. tenuis*.

1778. GOTTLIEB, D. 635.64: 632.48
The production of healthy shoots by wilted tomato plants.

Phytopathology, 1944, 34: 353-4.

During observation over a number of years at Minnesota Experiment Station on the behaviour of tomato plants inoculated with *Fusarium bulbigenum* var. *lycopersici* occasionally wilting plants have put forth from the meristematic regions near the base of the plant shoots entirely normal and healthy, although the parent stem above and below the junction has been full of the pathogen. No explanation is offered.

1779. CROXALL, R. G. 635.64: 632.411
The control of blight (*Phytophthora infestans*) on outdoor tomatoes.

A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 95-9, bibl. 2.

In 1942 the incidence of blight was so small as to prevent deductions. In 1943 two sprayings with bordeaux, cuprous oxide and copper oxychloride gave adequate control and caused an average increase in weight of marketable fruit of more than 100%. A consideration of costs and return indicates that yearly routine spraying of outdoor tomatoes under west country conditions is economic.

1780. RUDOLPH, B. A. 635.64: 632.48
The unimportance of tomato seed in the dissemination of *Verticillium* wilt in California. *Phytopathology*, 1944, 34: 622-30, bibl. 10.
Of nearly 27,000 seeds from 180 tomato plants, which were seriously affected by *Verticillium* wilt and whose receptacles had been proved to be infected, only two produced plants affected with *Verticillium* during 5 seasons. The trials were conducted at the California Agricultural Experiment Station.
1781. ANDERSON, L. D., AND WALKER, H. G. 635.64: 632.78
Tomato pinworm control in the greenhouse. *J. econ. Ent.*, 1944, 37: 264-8, bibl. 5.
The tomato pinworm, *Keiferia lycoopersicella*, has been a troublesome pest of greenhouse tomatoes at the Virginia Truck Experiment Station. In spray tests started in 1943 two applications of certain pyrethrum and rotenone sprays on the foliage were found to give good control, whilst calcium arsenate and cryolite proved unsatisfactory. The results of dipping tests with pinworm larvae and of ovidical tests are also reported.
1782. WALKER, H. G., AND ANDERSON, L. D. 635.64: 632.78
Tomato hornworm control. *J. econ. Ent.*, 1944, 37: 308, bibl. 2.
Krytox (50% cryolite and 20% sulphur) and cryolite were found to be good substitutes for calcium arsenate dusts for the control of tomato hornworm, *Protoparce sexta* and *P. quinquemaculata*.
1783. BENNETT, L. G. 631.462: 635.64
The cost of steam sterilising. *Fruitgrower*, 1944, 98: 28.
The average crop weight of tomatoes in nurseries having heated houses is only 33.4 ton per acre. This low yield could be greatly improved by steam sterilizing the soil, but lack of knowledge of the cost involved deters growers from undertaking it. A costs enquiry was undertaken jointly by Reading University and growers. Two points of interest arose: (1) that the heavier the soil the greater the amount of steam required, the factors concerned being the specific heat of the soil, its thermal conductivity, porosity and specific gravity, and (2) the value of efficient stoking in reducing fuel consumption. The cost per acre to the three growers was £238, £236 and £270 respectively.
1784. ALLARD, H. A., AND ZAUMEYER, W. J. 635.65: 612.014.44
Responses of beans (*Phaseolus*) and other legumes to length of day. *Tech. Bull. U.S. Dep. Agric.* 867, 1944, pp. 24, bibl. 20.
A résumé is given of the more important behaviour of beans and other legumes as affected by length of day. The fact that latitudinal ranges in length of day are often of great significance in determining the successful northward limits of a particular strain has been seldom recognized by growers until recently. The effect of daily exposures to 9 different daylengths is recorded for some 86 horticultural varieties of *Phaseolus vulgaris* from work carried out at Arlington Experiment Farm, Va, from 1939 to 1944.
1785. MURNEEK, A. E., WITTWER, S. H., AND HEMPHILL, D. D. 577.15.04: 635.652
"Hormone" sprays for snap beans. *Proc. Amer. Soc. hort. Sci.* for 1944, 1944, 44: 428-32.
Naphthaleneacetamide and naphthoxyacetic acid sprayed on bush beans in aqueous solution at concentrations of 5 to 25 p.p.m. either increased or decreased the yield of pods according to the conditions. Since, however, they were not able to counteract the effects of unfavourable weather, they cannot as yet be recommended for general use.
1786. DAVIS, J. F. 635.65: 631.8
Soil management for beans. *Quart. Bull. Mich. agric. Exp. Stat.*, 1943, 25: 342-50, bibl. 3.
These are the main conclusions reached in fertilizer experiments with field beans conducted for a period of over 20 years in Michigan: (1) The fertilizer should be placed in a band about 1 in. to the side of and 1½ to 1¾ in. below the seed at the rate of 150 to 300 lb. per acre. The increase in yield from such optimum fertilizer treatment being limited to 2-4 bushels per acre, any other method of application could not be expected to be profitable. (2) The fertilizer used should contain phosphate and potash in the ratio 2:1. The significance of a potash application has been demonstrated. (3) The practice of ploughing in leguminous green manures, particularly alfalfa or sweet clover, has proved very beneficial, if carried out when the height of the latter does not exceed 8-9 in., increasing the yield by 2-6 bushels per acre. It has been further shown that the crop may be greatly affected by unfavourable weather conditions, especially during the blooming period, and that spacing of the plants in the rows has little effect on the yield unless the distance between plants is greater than 8 in. The chief data are presented in 6 short tables.
1787. HARTER, L. L., AND ZAUMEYER, W. J. 635.65: 632.1+632.3/4+632.8
A monographic study of bean diseases and methods for their control. *Tech. Bull. U.S. Dep. Agric.* 868, 1944, pp. 160, bibl. 571.
The information on bean diseases and their control presented in this imposing monograph has been assembled from numerous sources, partly obscure, as indicated by the number of references, but it is also partly based on the authors' own investigations, several minor diseases being described here for the first time. The scope of the bulletin may be gauged from the headings, under which more than one hundred diseases are dealt with: (1) *Field diseases of snap and dry beans*: fungus diseases; bacterial diseases; virus diseases; diseases due to nematodes and insects; nonparasitic diseases. (2) *Field diseases of lima beans*: fungus diseases; bacterial diseases; mosaic; blossom drop. (3) *Miscellaneous fungi and bacteria reported on snap, dry and lima beans*. (4) *Transit and market diseases*: fungus diseases; bacterial diseases; virus diseases; nonparasitic diseases; control of transit and market diseases. (5) *Inheritance of disease resistance and of certain abnormalities*: disease resistance; heritable abnormalities. The last complete report assesses the average losses from the principal diseases to the U.S.A. bean crop in 1938 at approximately 12%, the highest reduction in yield being 69%.
1788. HEDGES, F. 635.65: 632.3+632.8
Association of *Xanthomonas phaseoli* and the common bean mosaic virus, *Marmor phaseoli*. Effect on pathogenicity of the seed-borne infective agents. *Phytopathology*, 1944, 34: 662-93, bibl. 38.
Interesting questions are raised in this paper which gives a full report of extensive investigations on the interaction of *Xanthomonas phaseoli* and the common bean mosaic virus in an *in vivo* association observed by the author at the Plant Industry Station, Beltsville, Md, when testing No. 5 Refugee beans for mosaic resistance. It was found that mosaic-infected trifoliate bean leaves, both of susceptible and immune varieties, were often symptomless carriers of *X. phaseoli*, the expressed juice producing widespread *Xanthomonas* lesions on the rubbed primary leaves. The observation that in one experiment the bacterium seemed to function as a virus carrier is recorded as the most "thought-provoking" finding. The virus persisted for at least 6 weeks in typical *X. phaseoli* stock cultures on steamed potato, which were held for two weeks at laboratory temperatures. Further results of inoculation trials indicate

that after serial passages of the associated pathogens from bean plant to bean plant the pathogenicity of the bacterium decreases, while that of the virus increases. As the symptoms of bacterial infection disappeared following serial transfers a mildly virulent variant of *X. phaseoli* was re-isolated, probably produced by the influence of the virus.

1789. GLASSCOCK, H. H., WARE, W. M., AND PIZER, N. H. 635.65: 632.482

Influence of certain soil factors on chocolate spot of beans.

Ann. appl. Biol., 1944, 31: 97-9, bibl. 10.

A study of chocolate spot of beans [*Botrytis* sp.] during a severe local outbreak, undertaken by the South-Eastern Agricultural College, Wye, Kent, revealed no significant relation between severity of attack, soil texture, pH or available potassium. A highly significant relation was found to exist between the severity of attack and the amount of available phosphorus in the soil, the damage being generally severe on soils containing low amounts of available phosphorus and much less so on soils containing medium or higher amounts.

1790. MOORE, W. C. 634.65: 632.482

Chocolate spot of beans.

Agriculture, 1944, 51: 266-9.

Our present knowledge on the chocolate spot of beans, caused by *Botrytis cinerea*, is briefly summarized. An efficient method of control has not yet been devised, but it has been shown that potash and possibly phosphate deficiency aggravate the disease. A dressing of $1\frac{1}{2}$ cwt. of muriate of potash per acre or an equivalent amount of potash in another form will mitigate its worst effects. Growers are advised to have their soils analysed for potash and phosphate as soon as fertilizers are in more plentiful supply. Fortunately, a period of dry weather is often capable of checking a serious outbreak.

1791. DILLON WESTON, W. A. R. 635.65: 632.482

Chocolate spot of beans.

Agriculture, 1944, 51: 325-6.

A short but very clear description of the non-aggressive and aggressive phases of the chocolate spot of beans, caused by *Botrytis cinerea*, and of the conditions which favour epidemics and are, therefore, to be avoided. A chart illustrates the various developmental stages of host and fungus.

1792. REID, W. D. 635.65: 632.3/4+632.8

The resistance of beans against bean-wilt and anthracnose and notes on occurrence of bean mosaic.

N.Z. J. Sci. Tech., 1943, 25, Sec. A, pp. 125-8, bibl. 4.

The resistance of 44 varieties of beans to bean-wilt, anthracnose, and bean-mosaic is recorded. The beans were grown under field conditions, 34 being tested for 6 years and 10 for either 1 or 2 seasons. Of the beans tested for 6 years, 2 were free from bean-wilt, 6 from anthracnose, and 10 from mosaic. To indicate utility of varieties they are grouped in relation to resistance to the 3 diseases. [Author's summary.]

1793. RAPHAEL, T. D., AND WHITE, N. H. 635.65: 632.314

Varietal resistance to halo blight in beans.

J. Aust. Inst. agric. Sci., 1944, 10: 76-7.

The reactions of 14 bean varieties to a natural infection of halo blight caused by *Pseudomonas medicaginis* var. *phaseolicola* are noted as observed in a small-scale trial at the Summerleas Horticultural Experiment Station, Tasmania. The conditions of the experiment ensured that the results may be regarded as a good indication of the varietal resistance under Tasmanian conditions. The following varieties showed no sign of infection: Little Navy Bean, Hawkesbury Wonder, Clarendon Wonder, while 4 varieties proved moderately resistant and 6 varieties very susceptible.

1794. WALLIS, R. L. 635.65: 632.76

Control of the Mexican bean beetle in irrigated districts in the West.

Circ. U.S. Dep. Agric. 675, 1944, pp. 12, bibl. 3.

Spraying with derris or cube containing 0.02 or 0.015% rotenone gave good control of the Mexican bean beetle (*Epilachna varivestis*) on a dry bean crop on irrigated land in experiments conducted at Grand Junction, Colo., 1935-8. Cryolite and zinc arsenite sprays also proved efficient and should be preferred during the present emergency. The control of the beetle by insecticidal dusts and on garden or canning beans is discussed in an appendix.

1795. YU, T. F. 635.651: 632.48

Fusarium diseases of broad bean. I. A wilt of broad bean caused by *Fusarium avenaceum* var. *fabae* n. var.

Phytopathology, 1944, 34: 385-93, bibl. 10.

This newly described bean disease does considerable damage in important bean-growing districts in Yunnan, China. It is here systematically described both as to cultural and morphological characters. The leaves of the diseased plants turn a greenish-yellow, then wither and the plants eventually die. The vascular regions of the infected plants, especially the taproot and basal stem, are shaded brown to dark brown.

1796. RIOLLANO, A., AND RODRIGUEZ, J. P. 635.655

Trials with soybeans.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 441-4, bibl. 4.

Trials in Puerto Rico show Seminole to be a valuable vegetable variety.

1797. CALDER, R. A. 635.656

Field and garden peas.

N.Z. J. Sci. Tech., 1944, 25, Sec. A, pp. 242-55, bibl. 10.

A survey of the selection and breeding work on field and garden peas undertaken by the Agronomy Division, Lincoln, N.Z., 1930-43. The new varieties produced in the course of this work are named. Furthermore, pure seed has been produced of a number of established varieties which were carefully selected for their suitability under New Zealand conditions.

1798. CALDER, R. A. 635.656

A new garden pea: Greencrop (Greenfeast × Greatcrop).

N.Z. J. Sci. Tech., 1943, 25, Sec. A, pp. 165-9, bibl. 4.

The development in New Zealand of the new garden pea variety Greencrop from the parent varieties Greenfeast and Greatcrop is recorded and its varietal characteristics are described. The new pea has much in common with Greenfeast, but is a little earlier and tends to produce a heavier yield of green pods.

1799. REED, H. S. 635.656: 632.19: 546.47

The growth of ovules of *Pisum* in relation to zinc.

Amer. J. Bot., 1944, 31: 193-9, bibl. 13.

The early development of the ovule and embryo of peas under conditions of zinc deficiency was studied at the University of California, Berkeley. The plants were grown in nutrient solutions containing varying amounts of zinc. At 0.5 p.p.m. the ovule developed normally, whereas lower concentrations were found to produce atypical forms, often without functional micropyles or embryo sacs. From these observations and the further finding that pollen grains remain unaffected in a concentration as low as 0.02 p.p.m. it is concluded that the lack of seed production in peas associated with zinc deficiency is caused by the abnormal development of the ovules. The rôle of zinc in the developmental process involved is discussed. Drawings and photos of sections illustrate various stages of ovule disorganization.

1800. ANON. 635.656: 631.531.17
Dusting of pea seed.
Agric. Gaz. N.S.W., 1944, 55: 338-9.
Where machine-sown peas were grown for the first time and the seed was treated with a pea nodule culture, seed treatment with Spergon at the rate of $1\frac{1}{2}$ oz. per bushel proved superior to that with other protectant fungicidal dusts. Agrosan or Ceresan at the rate of 1 oz. per bushel are recommended for machine-sown peas on other than new ground where no nodule culture is applied. For smaller hand-sown areas any one of the copper-oxychloride seed dusts was satisfactory if used at the rate of 2 oz. per bushel. The tests were conducted by the Department of Agriculture, N.S.W. A diagram is given of a machine suitable for dusting large quantities of peas.
1801. DAVIES, D. L. G. 635.656: 632.48
Infection of pea seedlings with the *Fusarium* causing foot rot, and some environmental relations of the fungus.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 103-7, bibl. 10.
It was found that the fungus causing foot rot of peas, cannot grow at 32° F. or 89·6° F., the optimum temperature for growth lying between 78·8° F. and 82·4° F., and out of door seedling attack was induced only under conditions of high temperature. Susceptibility is not affected by soil acidity.
1802. KLIGMAN, A. M. 635.8
Control of the truffle in beds of the cultivated mushroom.
Phytopathology, 1944, 34: 376-84, bibl. 5.
The truffle fungus, *Pseudobalsamia microspora*, causes substantial loss in mushroom beds in U.S.A. The fungus spores are brought in with the soil. The fact that the truffle spores will not germinate at so low a temperature as 60° F. while a normal, though slower, set of mushroom spawn can be secured at that temperature, offers a ready means of control. Fungicides are ineffective for eradicating the spores in the soil, and as secondary infection does not occur their use is not justified. Superficial invasion of a bed may be dealt with by drying up the infested area.
1803. ADDICOTT, F. T. 633.913-2.951.8
(29) Anatomical effects of oil spray injury in guayule seedlings.
Phytopathology, 1944, 34: 697-9.
- BEARE, J. A. 635.13-2.954
The use of kerosene sprays for weeding carrots.
J. Dep. Agric. S. Aust., 1944, 47: 344-5.
See also *J. Dep. Agric. Vict.*, 1943, 41: 575-6, *H.A.*, 14: 728.
- BECKER-DILLINGEN, J. 635.1/7
Handbuch des gesamten Gemüsebaues einsch. des Gemüsesamenanbaues, der Gewürz- und Küchenkräuter. (Handbook of vegetable growing including vegetable growing for seed and cultivation of spice and kitchen herbs.)
P. Parey, Berlin, 1943, pp. 890, 4th revised edit., RM. 33.40, from review *Forschungsdienst*, 1944, Vol. 17, abstr. p. 6.
- BOWEN, C. V., AND BARTHEL, W. F. 633.71: 615.783.22
Identification of nornicotine in tobacco.
Industr. Engng Chem. (Analytical Edition), 1944, 16: 377-8, bibl. 8.
- BROWN, J. G., AND BOYLE, A. M. 633.526.42-2.3
Bacterial soft rot of *Sansevieria*.
Phytopathology, 1944, 34: 350-1, bibl. 1.
- BURR, H. S., AND SINNOTT, E. W. 635.62/63: 581.47
Electrical correlates of form in cucurbit fruits.
Amer. J. Bot., 1944, 31: 249-53, bibl. 6.
- BURTON, W. G. 664.21.047: 633.491
The characteristics of certain varieties of potato with special reference to their suitability for drying.
Ann. appl. Biol., 1944, 31: 89-96, bibl. 18.
- CURRENCE, T. M. 635.64: 631.523
A combination of semi-sterility with two simply inherited characters that can be used to reduce the cost of hybrid tomato seed.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 403-6, bibl. 3.
- DITMAN, L. P., CORY, E. N., AND OWENS, H. B. 635.656: 632.753
Pea aphid work in Maryland during 1943.
J. econ. Ent., 1944, 37: 258-61, being *Sci. Pap. A.74*, and *Contr. Md agric. Exp. Stat.* 1928.
- ESAU, K. 633.63-2.8
Anatomical and cytological studies on beet mosaic.
J. agric. Res., 1944, 69: 95-117, bibl. 66.
- GARCIA RADA, G. 633.52-2.5
Dodder on flax and its control.
Phytopathology, 1944, 34: 704-5.
- HANNA, G. C., AND OTHERS. 635.1/7
An evaluation of California vegetables.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 339-42, bibl. 3.
See also *H.A.*, 14: 1194-1196.
- JONES, H. A., CLARKE, A. E., AND STEVENSON, F. J. 635.25: 575
Studies in the genetics of the onion (*Allium cepa*).
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 479-84, bibl. 4.
- KALIN, E. W. 635.64: 631.85
pH of extracted cell sap and phosphorus content of young tomato plants growing on varying levels of phosphorus.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 235-8, bibl. 6.
- KERBER, J. P. 633.491-1.67
Potato growing under irrigation.
J. Dep. Agric. S. Aust., 1944, 47: 507-10.
- VAN OVERBEEK, J. 577.15.04: 633.491
Auxin, water uptake and osmotic pressure in potato tissue.
Amer. J. Bot., 1944, 31: 265-9, bibl. 22.
- PICKETT, B. S. 635.11: 581.036
The effect of temperature on the growth rate of field grown beets.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 457-61, bibl. 2.
- RAY, C., JR. 633.52: 576.3
Cytological studies on the flax genus, *Linum*.
Amer. J. Bot., 1944, 31: 241-8, bibl. 29.
- ROCKWOOD, L. P., AND REEHER, M. M. 635.656: 632.753
Forecasting outbreaks of the pea aphid on fall-sown annual legumes in the Pacific Northwest.
J. econ. Ent., 1943, 36: 832-7, bibl. 2.
- SAKR, E. S. M. 633.42: 581.036+612.014.44
Effect of temperature and photoperiod on seed stalk development in turnips.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 473-8, bibl. 2.

SCHUSTER, M. 633.52-2.48
The nature of resistance of flax to *Fusarium lini*.
Phytopathology, 1944, 34: 356.

SLIPP, A. W., AND SNELL, W. H. 635.8
Taxonomic-ecologic studies of the *Boletaceae* in
northern Idaho and adjacent Washington.
Lloydia, 1944, 7: 1-66, bibl. 55.

SMITH, E. G. L. 635.1/7
Early vegetables in cold areas.
Fmg S. Afr., 1944, 19: 496, 502.
Practical hints on raising.

SMITH, P. G., AND MACGILLIVRAY, J. H. 635.1/7
Key to common vegetables based on vegetative
characters.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 334-8, bibl. 3.

SMITH, P. G. 635.64: 631.521
Embryo culture of a tomato species hybrid.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 413-6, bibl. 12.

STAPP, C., AND MARCUS, O. 633.71-2.8
Serologische Untersuchungen am Tabak über
Ausbreitung und Verteilung der drei Kartoffel-
viren X, Y und A. (Serological investigations on
the spread and distribution in tobacco of the three
potato viruses X, Y and A.)
Zbl. Bakt., Abt. II, 1943, 105: 369-405, from
abstract *Gartenbauwiss.*, 1944, Vol. 18, abstr. pp.
47-8.

By Stapp's method at Berlin-Dahlem.
TOBLER, F. 633.5
Der Besenginster als Faserpflanze. (Broom
as a fibre plant.)
Faserforsch., 1943, 16: 81-93, from abstract
Gartenbauwiss., 1944, Vol. 18, abstr. p. 39.
WARE, L. M., AND JOHNSON, W. A. 635.1/7: 631.84

Nitrogen requirements of different groups of
vegetables. [In Alabama.]
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 343-5.

WILLIAMSON, A. L. 635.65: 632.78
Two foreign bean pod borers discovered in Texas.
J. econ. Ent., 1943, 36: 936-7, bibl. 2.
Epinotia opposita and *Maruca testulalis*.

FLOWERS AND ORNAMENTALS.

1804. CHADWICK, L. C. 635.97: 631.8+632.19
Diagnosis of nutritional requirements of orna-
mental plants.
Combined Proc. 19th nat. Shade Tree Conf. and
10th Western Shade Tree Conf., 1944, pp. 5-19,
bibl. 11.

The author follows up a simple exposition of the function
of the major and some of the minor elements with a con-
sideration of the symptoms seen in woody plants when
individual elements are wanting. He also gives a key to the
detection of more advanced stages of the following deficien-
cies:—nitrogen, phosphorus, potassium, magnesium, zinc,
iron, manganese, sulphur, copper, calcium and boron.

1805. RANDOLPH, L. F., AND COX, L. G. 635.937.9
Factors influencing the germination of *Iris* seed
and the relation of inhibiting substances to
embryo dormancy.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 284-300, bibl. 8.

The delayed and incomplete germination shown by iris seed
is a serious obstacle to progress in iris breeding. Numerous
experiments in relation to iris germination have been made
at Cornell University. The most successful results were
obtained by removing the embryos from the seed and
cultivating them on sterile nutrient agar. Germination of
stored seed was obtained within a few days and 90% of the
embryos cultured were fit for transplanting within a few
weeks. The interval from seed to flowering, normally
taking 2 to 3 years, was thus reduced to one year. The
inhibiting substance resides in the endosperm, from which
the embryo must be completely detached if quick results
are to be obtained. Certain other treatments involving less
trouble than embryo extraction raised germination from
the normal 15-20% to 64%. These methods are fully
discussed and suggest that the inhibiting substances, the
nature of which was not investigated, are highly stable.
Air-dried iris seed germinated better than fresh seed and
viability was retained for at least 12 years.

1806. KNJAZEVIĆ, A. A., AND TIMOFEEV, I. I. 635.9
The cultivation of *Tigridia pavonia* Ker.-Gawl.
out of doors. [Russian.]
Sovetsk. Botan., 1943, No. 3, pp. 31-5.

Having drawn attention to the bright colours and distin-
guished appearance of the flowers which are the noteworthy

characteristics of this member of the *Iridaceae* family the
author describes its botanical characters, and then gives an
account of the methods of cultivation used at the Komarov
Botanical Institute of the Academy of Sciences of the U.S.S.R.
near Leningrad. It has usually been supposed that if the
plant is propagated by seed, it cannot be made to flower
until the second year. The methods described here, however,
enabled the flower to be formed in August or September
from seed sown the previous November or December. The
seedlings are wintered in cold frames and transferred to a
warm glasshouse in spring, where they are started into
active growth.

1807. WILLIAMS, H. H. 635.976.4: 577.15.04: 631.535
Studies on the propagation of certain broad-leaf
evergreens with special reference to leaf-bud cuttings
and root-inducing substances.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 323-30, bibl. 4.

The use of dusts is more convenient to nurserymen than
liquid applications of growth substances, but in the labora-
tory no difference as regards the mechanics of the application
were found. Larger amounts of cuttings can be treated
simultaneously with solution. The quantitative factor of
root-inducing chemicals has been shown to have a very
definite influence on the amount of roots produced, but in
these studies no experimental evidence as to the influence
of the quantity of dust was obtained. Roots from dust-
treated cuttings were longer, more branched and more
numerous and strikingly different in appearance from those
treated with solution, though the percentage of cuttings
rooted in the dusts is lower than in the solutions. Leaf bud
cuttings compared favourably with stem cuttings in most of
the species tested (*Ilex*, *Camellia*, *Myrica*, *Osmanthus*,
Photinia, *Prunus*) and produced much greater shoot growth
for a given amount of cutting material. Cuttings of the
season's wood responded most favourably to all treatments
both in rooting percentages and shoot production; cuttings
of *Ilex* species treated with solutions were dwarf and pro-
duced a heavy crop of parthenocarpic berries, suggesting
that the cuttings could be grown commercially for Christmas
sale. The nurserymen who replied to a questionnaire were
almost unanimous in stating that the use of root-inducing
substances in nursery work was not economically worth
while.

1808. POST, K. 612.014.44: 635.939.98
The effect of an interval of long days in the short day treatment on the flowering of chrysanthemums.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 311-5, bibl. 1.
A long day interval of 5 to 20 days given after 28-35 short days delayed bloom by a maximum of 8 days compared to continuous short day treatment. It increased the size of the flower slightly and the individual flower heads were on longer peduncles, thus allowing the flower heads to stand farther apart.
1809. ENGLISH, L. L., AND TURNIPSEED, G. F. 635.9: 631.535: 632.944
The fumigation of camellia and azalea cuttings with methyl bromide.*
J. econ. Ent., 1944, 37: 81-7, bibl. 1.
Cuttings from 58 varieties of azalea and 45 varieties of camellia were successfully fumigated with methyl bromide at dosages necessary to control red mite, thrips, camellia scale and tea scale. Rooted cuttings placed in flats of moist sand were also safely fumigated when removed from the greenhouse for transplanting. Practical requirements were met by doses of 2 lb. methyl bromide per 1,000 cu. ft., exposure 1-25 hrs. at 90° F. or 2-25 hrs. at 80° F.
1810. ENGLISH, L. L. 632.651.3: 632.944
Dowfume to kill nematodes in potting soil.
J. econ. Ent., 1944, 37: 307.
Nematodes in heavily infested potting soil were completely destroyed by the new soil fumigant Dowfume Br-10 composed of 12-2% methyl bromide, 26-2% carbon tetrachloride and 61-6% ethylene dichloride. The plants (gardenias) made much more rapid growth in treated soil.
1811. ROBERTS, A. N., AND MILBRATH, J. A. 635.944
The influence of flower removal on gladiolus corm development.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 319-22.
With most gladiolus varieties except the very tall ones the gain derived from flower removal is nil or only very slight. Loss in corm size after flower cutting for market is in direct proportion to the amount of leaf surface removed.
1812. McCULLOCH, L. 635.944: 632.48
A vascular disease of gladiolus caused by *Fusarium*.
Phytopathology, 1944, 34: 263-87.
A destructive disease of gladiolus in U.S.A. attacking primarily the vascular tissues of the plant, killing the leaves and ultimately destroying the corm is attributed to *Fusarium orthoceras* var. *gladioli* n. var. There are varietal degrees of susceptibility among gladioli, some being apparently completely resistant. The best means of control lies in the selection and use of resistant varieties. Chloropicrin will eradicate *Fusarium* from the soil but is suitable only for small areas on account of the expense. Planting stock may be dipped in fungicide with advantage in order to remove surface contamination. Infected corms are often inadvertently planted since symptoms only become visible when disease within the corm is well advanced.
1813. SCHOPP, R., EIDE, P. M., AND DOUCETTE, C. F. 635.944: 632.77
Experiments for field control of the Narcissus bulb fly.
J. econ. Ent., 1943, 36: 864-7, bibl. 2.
A lead arsenate-mineral oil combination known as "W.S.C. dynamite", mineral oil emulsion and refined naphthalene flakes were found to give good control of the narcissus bulb fly, *Lampetia equestris*.
1814. SMITH, R. 632.654.2: 635.97
Mites injurious to western shade and ornamental trees.
Combined Proc. 19th nat. Shade Tree Conf. and 10th Western Shade Tree Conf., 1944, pp. 57-62.
The injuries done by eriophyid mites (*Eriophyes* spp., *Phytopus* spp., *Phyllocoptes* spp., etc.) and by spider mites (*Tetranychus* spp. and *Paratetranychus* spp.) to different ornamental shade trees and their control, especially by oil spraying, are discussed.
1815. WILSON, G. F. 635.976: 632.752
The yew scale.
J. roy. hort. Soc., 1944, 69: 244-8, bibl. 5.
The yew scale, *Lecanium corni-crudum*, was first recorded in Great Britain in 1930. Notes are given of its life history and distribution. The chief sign of attack is the presence of a black deposit, a honeydew excretion on which grows sooty mould, and this deposit has a more serious effect on the plant than the feeding of the insects. Control can be obtained by spraying from mid-August to mid-September or in March with an emulsion of nicotine $\frac{3}{4}$ fl. oz., summer white oil $\frac{1}{2}$ pint, water 10 gal. applied forcefully and principally to the underside of the leaves. Tar oil washes can also be used in winter; results are not always satisfactory and the foliage may be injured. Derris and other dusts are moderately effective but unsightly since they adhere to the honeydew. Less serious pests of yew are the yew gall midge, *Taxomyia taxi*, the tortrix *Diitula angustiorana* and the vine weevil, *Otiorrhynchus sulcatus*.
1816. BEAL, J. M. 577.15.04: 635.937.36
(9) Some telemorphic effects induced in sweet pea by application of 4-chlorophenoxyacetic acid.
Bot. Gaz., 1944, 105: 471-4, bibl. 4.
BREAKEY, E. P. 632.944: 635.944
The effect of methyl bromide fumigation on the subsequent development of the Croft lily.
J. econ. Ent., 1944, 37: 277-9, bibl. 4, being Sci. Pap. Wash. agric. Exp. Stat, 595.
BRIERLEY, P., AND SMITH, F. F. 635.944: 632.8
Studies on lily virus diseases: the necrotic-fleck complex in *Lilium longiflorum*.
Phytopathology, 1944, 34: 529-55, bibl. 23.
GOULD, C. J. 635.944: 632.482
Tulip blight controlled by organic sulphur.
Phytopathology, 1944, 34: 703-4, bibl. 2, being Sci. Pap. Wash. agric. Exp. Stat. 579.
MCKAY, R. 635.976.32: 632.48
Scab [*Fusicladium pirinum* var. *pyracanthae*] on pyracanthas and its control.
J. roy. hort. Soc., 1944, 69: 204-7, bibl. 5.
PIRONE, P. P. 635.939.872: 632.3/4
Diseases of gardenia.
Bull. N.J. agric. Exp. Stat. 679, 1940, pp. 10.
PLAKIDAS, A. G. 635.944: 632.4
Black scale, a disease of Easter lily bulbs.
Phytopathology, 1944, 34: 556-71, bibl. 8.
SMITH, F. F., AND BRIERLEY, P. 635.944: 632.8
Preliminary report on some mosaic diseases of iridaceous plants.
Phytopathology, 1944, 34: 593-8, bibl. 6.
SWARTLEY, J. C. 635.976.32: 581.144.2
Adventitious root initiation in *Forsythia suspensa*.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 301-6, bibl. 3.

* See also H.A., 14: 831.

CITRUS* AND SUB-TROPICALS.†

1817. HALL, W. J. 634.3(689.1)
Citrus research in Southern Rhodesia.
Ann. appl. Biol., 1944, 31: 164-6.
The survey covers the period from the beginning of 1927 to the end of 1942. The problems tackled successfully were the control of citrus thrips, citrus aphid, red scale and cotton boll worm, the prevention of wastage, maturity tests in relation to the standards of South African Citrus Exchange, removal of sooty blotch from picked fruits, manurial and composting experiments, improvement of irrigation and cultural methods, cover cropping, boron deficiency, erosion control, and the rehabilitation of ailing trees on eroded ground. The research station at Mazoe has been closed temporarily during the war.
1818. WATERSTON, J. M. 634.3(729.9)
Citrus culture in Bermuda.
Bull. Dep. Agric. Bermuda 22, 1944, pp. 22.
The view is expressed that citrus growing in Bermuda could well be increased, attempts in the past having failed entirely through lack of care. The bulletin gives full information as to the planting and after-care of citrus under Bermuda conditions, special attention being paid to manuring and pest control. In view of the lack of zinc, manganese and copper in Bermuda's highly calcareous soils it is suggested that young trees up to their 4th year require a nutritional spray containing these ingredients to be applied to the foliage at stated intervals in addition to a ground manure comprised of 1 part castor pomace to 3 parts chemical fertilizer 5-10-5. A sawdust or other type of mulch should be used round the trees to conserve soil moisture. It is the soil moisture rather than the nutrient status which is the limiting factor in crop production in Bermuda. A comprehensive spray schedule is provided.
1819. DALLAS, W. K. 634.334(931)
Lemon culture in New Zealand.
N.Z. J. Agric., 1944, 68: 269-74, 341-6, 421-4, and 69: 49-53.
The article begins with a warning that the lemon market in New Zealand is already fully supplied except from January to April and that the prospect of successful export is remote. The main commercial varieties grown are Lisbon and Eureka. The chief stocks are rough lemon (known as citropella in N.Z. and Australia), and the sweet orange, while sour orange, trifoliate orange and pomelo have limited use. Too little is known of stock effect in New Zealand for definite recommendations to be made. The method of raising these stocks from seed is described, as are the method of budding, the treatment of budded trees and other grafting methods such as topworking. The soil type recommended is a deep sandy or clay loam over a porous subsoil. Soil preparation of new ground should occupy two full seasons, the conditioning crops being potatoes, followed by lupins in the first year followed by further working and cover crop in the second year. A list is given of trees suitable for the necessary shelter belts against wind. These should be planted 2 years before the lemons. The planting distance for lemons except on poor soils, when it may be closer, is 25 ft., 69 trees to the acre. Six handfuls of a mixture consisting of 3 parts lime, 2 parts superphosphate and 1 part bone-dust should be worked into each planting hole. Superfluous branches should be taken off at planting, leaving 3 or 4 branches to the tree, since a tree with a top too heavy for its roots at transplanting seldom thrives. The pruning of bearing and non-bearing trees is discussed. Deep cultivation is advocated in order to encourage rooting in the middle and lower soil strata; unless deeply rooted the tree, it is said, will not bear continuously

the heavy crops necessary for successful commercial purposes. The high humus content of the soil necessary for lemons is maintained by cover-cropping. Late summer and autumn weeds may provide a substitute: earlier weeds absorb too much of the reduced soil moisture. Fertilizer requirements, diseases and pests and the renovation of unthrifty trees are discussed. Picking, curing and packing are dealt with at some length.

1820. (NICHOLSON, D. J.) 634.31
Florida nurseryman patents navel orange.
Calif. Citrogr., 1944, 29: 249.
A new navel orange to be known as Dream Navel has been patented in U.S.A. by Mr. D. J. Nicholson, 1224 Palmer Street, Orlando, Florida. The orange is in season in Florida from October to January, acquires its "remarkable flavour" early and maintains it throughout. It has a high juice content, averaging more than 5½ gal. per box, is of medium size and free from dryness at all times. Among other citrus varieties developed by Mr. Nicholson, for which patents have been sought, are a sweet, seedless, early grapefruit, a thornless key lime, a "strawberry lime", a seedless ruby orange and a late "puffless tangerine".
1821. TURRELL, F. M., CARLSON, J. P., AND KLOTZ, L. J. 634.3: 581.47
Surface and volume of citrus fruit.
Calif. Citrogr., 1944, 29: 232.
Tables have been constructed from which, with the aid of calipers, the surface and volume of any citrus fruit may be calculated, from the size of a pea upwards. The average percentage of error in the surface estimations was 2.66 for lemon, 2.25 for grapefruit, 5.59 for Valencia, and between 2.39 and 3.41 for Washington Navels. The volumetric error ranges from 0.1% to 3.4%. The tables can be obtained from the senior author, Citrus Experiment Station, Riverside, California, price 1 dollar.
1822. NANDI, H. K., BHATTACHARYA, S. C., AND DUTT, S. 634.31-1.541.11
Nursery behaviour of five indigenous citrus rootstock varieties with Khasi orange as scion in Assam.
Ind. J. agric. Sci., 1943, 13: 489-93, bibl. 12.
The nursery behaviour of Khasi orange budded on 5 selected indigenous citrus varieties as rootstocks was tested at the Citrus Research Station, Burnihat, Assam. Scions on Pani jamir, i.e. *Citrus limonia*, showed the most vigorous and healthy growth, having reached a height of 102.04 cm. within 28 days after budding. Sohmyndong (rough lemon) induced almost equal vigour, whereas scions on Rababenga (shaddock) and Karun jamir (Seville orange) exhibited chlorosis in various degrees, probably as symptoms of incompatibility. Growth on Satkora, *Citrus hystrix*, was very slow (55.67 cm.), but the trees had a healthy appearance. The vigour of the root system was found to be related to the vigour of the scion. Photographs are shown of typical budded plants and fruits of the 5 rootstocks.
1823. HODGSON, R. W., AND CAMERON, S. H. 634.3-1.541.11
Some instances of scion dominance in citrus.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 131-8, bibl. 7.
Data obtained [at California University] from 72 carefully propagated and selected citrus trees, consisting of combinations of 17 scion clones and 3 rootstock clones, of which the root-systems of 49 trees were excavated, have provided data which support the conclusion that in citrus trees the scion determines the rate of growth and ultimate size of tree when its vigour is less than that of the rootstock. [Authors' summary.]

* See also 1494, 1495, 1524.

† See also 1948.

1824. HALMA, F. F. 634.31-1.541.11
Quality of fruit from own-rooted and budded orange trees.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 223-6, bibl. 3.

Effects of own roots or strange roots on quality were diametrically opposite in Valencia and Washington Navel orange but were not commercially significant in either.

1825. BATCHELOR, L. D., AND ROUNDS, M. B. 634.334-1.541.11-2.19

Effect of rootstock on lemon decline and yield in two experimental orchards.

Calif. Citrogr., 1944, 29: 242-3, 265-9, bibl. 11.

A progress report on extensive rootstock trials for lemons, started in 1927-30 by Dr. H. J. Webber, Citrus Experiment Station, Riverside, California and involving a total of more than 1,700 trees. Decline of lemons, the symptoms of which are described, is a serious problem in U.S.A. No reasons have yet been discovered, but it seems that rootstock effect may be involved. At any rate resistance to decline in the 2 experimental orchards, on well drained loam and heavy silt loam respectively, shown by Eureka and Lisbon lemons on Sampson tangelo stock has been striking when compared to resistance on other stocks. This resistance has persisted for 17 years. Reasons for it are not understood. The fibrous roots of Sampson tangelo are more resistant to injury by nitrate and by *Phytophthora* spp. than are other rootstock species. Decline on most stocks except sweet orange is more in evidence on the heavier silt soil. Lisbon at Riverside has shown more decline than Eureka on any stock. There are 3 types of Lisbon, of different degrees of vigour. The type used there is fairly vigorous and is known as semi-dense. The others are short-thorn and open-type. Short-thorn suffers less from decline than either of the other two. (It is sometimes confused with Villafranca.) As regards yield, Eureka on sweet orange yields more than on sour, because the trees are larger and less affected by decline. Eureka on mandarin has recently caught up with sweet orange. Eureka on Cleopatra mandarin, which is especially promising, has exceeded the yields on sweet stock by 26% during the last three years. Grapefruit and rough lemon are not recommended. Yields on Sampson tangelo have exceeded those on sweet orange by an average of 32% over 3 years and this stock is well worth trying with other strains of Eureka. Lisbon has been affected by rootstock in much the same way as Eureka. As with Eureka the relative position of the mandarin orange has greatly improved, but less so on the lighter soil. Rough lemon has been erratic on heavy soil but on light loam it has produced only a little less than sweet orange. Sampson tangelo has improved until it equals sweet stock for yield though there are signs that it is less suited to Lisbon than to Eureka.

1826. CHAPMAN, H. D., BROWN, S. M., AND RAYNER, D. S. 634.3-1.8

Diagnosing the fertility needs of citrus trees.

Calif. Citrogr., 1944, 29: 182.

A progress report on leaf analysis at Riverside Citrus Experiment Station. The early stages of deficiency in citrus of zinc, iron, manganese and magnesium can usually be positively diagnosed: the early stages of nitrogen, sulphur, phosphorus, potassium, calcium, boron and copper deficiencies show no tangle leaf pattern or growth or fruit characteristics. In sampling the trees grown in solution or orchard trees, 30 to 50 spring cycle leaves on fruitbearing branches are picked in a circle, waist to shoulder high around the tree. In orchard sampling the leaves are taken from about 10 trees in a representative area of the orchard. So far most work has been done on potassium. Indications are that leaves containing less than 0.2% potassium on a dry matter basis are deficient. Leaves containing 1%, or more are amply supplied. Correlative studies are in progress on analyses which fall between these figures. Most citrus orchards examined in California showed potassium values

in leaves of 0.4-1%, a range within which it is uncertain whether K deficiency exists or not.

1827. BATHURST, A. C. 634.3-1.8: 581.192
Method of sampling citrus leaves for diagnosis purposes.

Fmg S. Afr., 1944, 19: 329-30.

Citrus growers in South Africa are encouraged to take advantage of the free leaf analysis service offered by the Division of Horticulture as a means of controlling crop nutrition. Instructions are given on the selection of trees and leaves for sampling, time of sampling, size and treatment of samples and particulars required by the office.

1828. BATHURST, A. C. 634.3-1.8: 581.192

Leaf analysis of citrus.

Fmg S. Afr., 1944, 19: 325-8.

Following the publication of his paper "New method for estimating the fertilizer requirements of citrus trees" (*Ibidem*, 1943, 18: 323-7, *H.A.*, 13: 1471) the author received citrus leaf samples from many South African growers. His present article summarizes the results of leaf analyses from some 50 orchards. They showed that of the major elements nitrogen and calcium were more frequently low than phosphorus, potassium, magnesium or sulphur. As regards the minor elements the author notes that zinc deficiency—a common phenomenon readily cured by zinc sprays—can be more easily diagnosed from appearance than by analysis. A few of the samples showed manganese deficiency. There were two cases of a probable copper deficiency. Only one case of boron deficiency was noted as against one or two of excess boron. An interesting sample consisted of some rather pale leaves, abnormally high in manganese and rather low in iron. It would appear that the functions of iron in the tree are being interfered with by excess of manganese.

1829. SUMMERSVILLE, W. A. T. 634.3-2.19
Deficiency diseases of citrus.

Qd agric. J., 1944, 58: 362-6.

The following more important deficiency diseases of citrus and their control under Queensland conditions are described: mottle leaf (zinc), exanthema (copper), nitrogen and iron deficiencies.

1830. GUEST, P. L. 634.3-1.8: 631.18

Root contact phenomena in relation to iron nutrition and growth of citrus.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 43-8, bibl. 3.

Sand culture trials with sweet orange seedlings under neutral and alkaline conditions show the importance of particle size and distribution of solid-phase components in relation to nutrition.

1831. HARRIS, A. R. C. 634.3-2.19: 546.27

The turmeric determination of water-soluble boron in soils of citrus orchards in California.

Soil Sci., 1944, 58: 123-37, bibl. 19.

California citrus soils did not show any boron deficiencies in extensive investigations, which also dealt with improvements of the turmeric method for boron and were conducted at the University of California Citrus Experiment Station.

1832. V. D. MERWE, A. J. 634.3-1.416.1

Loss of rhizobial nitrogen due to leaching in a citrus orchard.

Fmg S. Afr., 1944, 19: 497-502.

Determinations of mineral nitrogen loss due to leaching in a sandy soil of the Rustenburg district, which is representative of citrus orchards in the area, have been made for several years by the Division of Horticulture, Pretoria. It was shown that by the end of October the loss of mineral nitrogen rose to 55.2%, where irrigation was applied in addition to rain. There was no difference in the leaching of nitrogen between ammonium and nitrate. Leaching can be reduced by irrigation judiciously applied according to rainfall, sandy soils requiring more frequent irrigations with less water than loam or clay soils. The loss of nitrogen under

various conditions and applied in various forms is illustrated diagrammatically. A table is given of nitrogen losses in terms of money.

1833. SHAMEL, A. D., AND PUMEROY, C. S. 634.31-1.542.24

Effect of trunk girdling on the performance of Washington Navel orange trees.

Proc. Amer. Soc. Hort. Sci. for 1944, 1944. 44: 30-4, bibl. 1.

SHAMEL, A. D. 634.31-1.542.24

Effect of trunk girdling on Navel orange trees. Calif. Citrusgr., 1944, 29: 230-1.

Data are presented which show that the girdling of Washington Navel orange trees at about full blossom in the El Pico Orchard, Highgrove, California, increased yield 53%, or about 1 and 1/4 boxes per tree. Results were still satisfactory when girdling was done within 1 week on either side of full blossom. Girdled trees may require additional nitrogen to cope with the heavier crops. Girdling is not a cure for habitually low yielding orchards. The method is to circle the tree with a single cut through the outer bark and cambium while it is in full bloom.

1834. PIERCE, F. H. 634.3-1.542

To prune or not to prune. Possibilities of changes in citrus pruning practices.

J. Dep. Agric. S. Aust., 1944, 47: 496-502.

A South Australian citrus grower suggests that not only precious time is wasted but that frequently harm is done by too severe citrus pruning as generally practiced. He would like to see pruning confined to (1) keeping young trees trimmed in the formative stage, (2) removal of undesirable limbs, dead branches, water shoots, etc., and (3) removal of dense inner growth. Results of Californian trials and articles of American growers are quoted in support of this view. Six letters from Australian experts, all officers of the Commonwealth, who were asked by the author to give their opinion on citrus pruning practices, add to the interest of this paper, which was read at a Conference of River Murray Branches of the Agricultural Bureau of South Australia in May 1944.

1835. MUMFORD, I. 634.3-1.67

Irrigation experiments with citrus trees in the Sunday's River Valley.

Eng. S. Afr., 1944, 19: 444-9, bibl. 1.

While the more important problems of citrus irrigation under the salinity conditions of the Sunday's River Valley have been solved by I. J. Thomson, Publ. Univ. Pretoria 40 (ser. 1), 1937, H.A., 5: 529, such troubles as low soluble solids content and "puffiness" of the fruit (=cracking of the rind) required further investigation. An experiment with Valencia over a 5-year period was therefore carried out at Willowree by the Citrus Research Station. Added, and led to the following recommendations: (1) Apply 20-30 in. of water including "effective" rainfall annually, i.e. 24-3 in. at each scheduled irrigation with moderately clear cultivation. (2) Avoid waiting during the blossoming and fruit-setting period from August to November. (3) during the period of February to June allow a slight amount of "drying-out", a process by which fruit quality is apparently favourably influenced. The symptoms associated with under-irrigation were defoliation, tree decline, increased "puffiness" and decreased yield, the quality of the fruit being excellent. Over-irrigation produced better tree growth, higher yields and decreased "puffiness", but the fruits had a soluble solids content below the required standard and were of poor keeping quality.

1836. WESSER, H. J. 634.3-1.542.14-2.8

The "tristeza" disease of sour-orange rootstock.

Proc. Amer. Soc. Hort. Sci. for 1943, 1943. 43: 160-8, bibl. 12, being Pap. Citrus Exp. Stat. Riverside, Calif. 1945.

Although the sour orange has been the dominant rootstock

in most citrus-growing countries, when combined with sweet orange scion in South Africa is invariably fails. The same trouble occurs in Java and has now spread to Argentina and Brazil. In all these countries sour stock ungrafted or combined with lemon, though not with all other citrus varieties, flourishes and makes large trees. It is only when the sweet orange is used as a top that the sour stock is injured. There is no injury in the reverse order or if sweet orange is used as an intermediate on a sour base. The author summarizes and analyses the opinions of the leading citrus authorities on the problem. He himself inclines to the virus theory. If it be assumed that the foliage of the sour orange and the lemon produces regularly and normally some product of metabolism that inhibits the action and development of the virus, it would explain all the difficulties now experienced in attributing the disease to a virus, and would explain also a number of other peculiarities which have been noted by various writers. Deprived of its leaves the sour stock cannot resist the action of the virus passed on by the sweet stock and other toxic soons which are themselves symptomless carriers. The disease seems to be spreading from country to country, and since millions of trees are on sour stock a solution and control of the problem is pressing.

1837. BRANCOUET, A. A. AND FAWCETT, H. S. 634.3-2.8

Statistical studies of distribution of psorosis-affected trees in citrus orchards.

Phytopathology, 1944, 34: 358-75, bibl. 8.

An analysis of a number of careful records of psorosis-affected trees in certain citrus orchards in California throws light on the distribution and probable manner of spread of this disease in orchards. For reasons which are stated root grafts occurring naturally between adjacent trees in the orchards are considered as the most probable means of transmission, though the possibility of transmission by means of insect vectors cannot be entirely discounted.

1838. REID, W. D. 634.34-2.314

Resistance of Poorman's Orange against citrus canker (*Pseudomonas citri* Hass).

N.Z. J. Sci. Tech., 1943, 25, Sec. A, pp. 170-3, bibl. 3.

The rare incidence of citrus canker on Poorman's Orange or New Zealand grapefruit under orchard conditions gave rise to the question whether it was necessary to include this tree fruit in the citrus canker eradication campaign. The author summarizes the results of his inoculation trials as follows: "Rough lemon, sweet orange, and strains of New Zealand grapefruit when artificially inoculated were equally susceptible to infection by *Pseudomonas citri* Hass. Differences in origin of scion or stock of New Zealand grapefruit did not alter the resistance to *P. citri* infection. Different cultures of *P. citri* were approximately equal in their power to infect citrus varieties. Some organisms (regularly isolated from citrus-canker lesions) and with similar colony characteristics to *P. citri* were not pathogenic to citrus varieties."

1839. KLOTZ, L. J. AND FAWCETT, H. S. 634.3-2.4

Treatment of brown rot gummosis.

Calif. Citrusgr., 1944, 29: 124-5.

The standard method of treating brown rot gummosis infections on citrus is the removal of the diseased bark and a 1/2 to 1 inch strip of healthy bark beyond the margin of the dark brown diseased portion as seen on the inner surface of the bark or outer surface of the wood. A heavy sharp knife is used for the smooth portion of the infected trunk and a scaly bark scraper for the union and crown and root areas. Infected crowns should be exposed to the air and sunlight by removing the soil down to the top of the main side roots. The exposed cambium should not be scraped. The exposed area is then dusted with one package spray, dried bordeaux or zinc-copper-lime or tetrachloroquinone, or is painted with 1% permanganate of potash

solution or with a water suspension of the three dust materials mentioned. The latter should be of the consistency of house paint. The exudation of a light-coloured, clear gum may follow copper applications. It is not due to disease and is harmless. After a week in which to dry the treated lesion is painted over with tree seal or white lead paint.

1840. HELY, P. C. 634.3-2.752

The white house scale (*Protaspis citri*). A pest of coastal citrus trees.

Agric. Gaz. N.S.W., 1944, 55: 283-5.

The life history of the white house scale, a common citrus pest of New South Wales coastal areas, and its effect on citrus trees is described. Fortunately, the scale has a number of natural enemies, an entomogenous fungus among them, which check its development after it has reached its climax and reduce it to a low ebb. Growers are advised to prevent unnecessary injury to their trees and to take steps before the natural control sets in. Such steps consist either in fumigation, which is, however, little practised in New South Wales, or in spraying with a 1.5% lime-sulphur wash. The spray does not kill the scales but prevents reproduction through a three-fold action, which is described, thus leading to the gradual dying out of the pest.

1841. LINDGREN, D. L., LADUE, J. F., AND DOW, D. 634.3-2.752

Preliminary studies with DDT in control of the California red scale [*Aonidiella aurantii*]. *Calif. Citrogr.*, 1944, 29: 180-1.

A progress report of trials with DDT, GNB-A or Gesarol in the control of certain citrus insects at the Riverside Citrus Research Station. In laboratory experiments the settlement and development of young scale crawlers on orange fruit was almost entirely prevented by a solution of 4 grams DDT in 100 ml. oil or 6 grams DDT in 100 ml. oil. When oil alone was used 1,050 young settled and developed per fruit. The DDT treatment was equally effective after 75 days on the fruit as it had been initially. Further work showed DDT to be less toxic to adult scale than to the young. The addition of ground cubé root proved effective. The effective combination in the laboratory against all classes of scale being 1% mineral seal oil + 1.7 g. ground cubé root + 4 g. DDT to 100 ml. oil. Used in solvents such as benzene, orthodichlorobenzene, xylene dibutyl phthalate and others DDT was less effective on adults, probably on account of the difficulty of getting the material in contact with the insect under protective covering, but its residual effect on the young scale emerging later was very great. Minor field tests have proved the value of DDT and these are to be continued. It is pointed out that at the moment DDT is strictly rationed for experimental purposes.

1842. SIMMONDS, H. W. 634.3-2.752: 632.96

The effect of the host fruit upon the scale *Aonidiella aurantii* Mask. in relation to its parasite *Comperiella bifasciata* How.

J. Aust. Inst. agric. Sci., 1944, 10: 38-9.

Experiments carried out at Waite Agricultural Research Institute, Adelaide, S.A., indicated that lemon as a host fruit has an inhibiting effect on the scale parasite, *Comperiella bifasciata*. Parasites bred on scale-infected oranges in jars gave consistently very much higher survival and yield figures than those bred on scale-infected lemons. Where the parasite was given the choice between oranges and lemons the preference for the former was evident.

1843. YUST, H. R., BUSBEY, R. L., AND NELSON, H. D. 634.3-2.752

Influence of decreasing, constant and increasing concentrations on results of fumigation of the California red scale with HCN.

J. econ. Ent., 1943, 36: 875-8, bibl. 7.

As a result of laboratory fumigation tests with California red scale (*Aonidiella aurantii*) it is suggested that in the field

high initial HCN concentrations are unnecessary, provided high average concentrations are maintained.

1844. YUST, H. R., NELSON, H. D., AND BUSBEY, R. L. 634.3-2.752

The influence of repeated fumigation with HCN on the susceptibility of the California red scale.

J. econ. Ent., 1943, 36: 872-4, bibl. 4.

The resistance to HCN fumigation of resistant strains of the California red scale (*Aonidiella aurantii*) was found to increase with repeated treatments in the laboratory as a result of elimination of the more susceptible individuals in each successive fumigation.

1845. YUST, H. R. 634.334-2.752

Productivity of the California red scale on lemon fruits.

J. econ. Ent., 1943, 36: 868-72, bibl. 3.

The productivity of 194 California red scales (*Aonidiella aurantii*) on lemon fruits was studied in a lemon grove near Corona, Calif. The records cover 4 groups of scales according to the time of year in which reproduction began. With scales beginning to reproduce in spring and early summer the length of the reproductive period was found to average 64.5 days as against 154.3 days with scales that began reproduction in late summer and autumn. The average number of progeny per scale varied from 65.5 for scales beginning to reproduce in winter to 158.5 for those beginning in midsummer, the maximum figure for one mother scale being 300. 35.2 was the average female progeny developing to the mature stage per reproducing scale in summer.

1846. HAYWARD, K. J. 634.3-2.752(824.5)

La cochinilla blanca de los citricos (*Unaspis citri* (Comstock)) en Tucumán. (Citrus mealy bug in Tucumán, Argentina.)

Circ. Estac. exp. agric. Tucumán 124, 1944, pp. 3-13.

An account is given of the life history and methods of control in Tucumán, Argentina, of a citrus mealy bug, *Unaspis citri*, now found wherever citrus is grown throughout the world. Control by spraying is rendered more difficult in Tucumán since for the greater part of the year the high temperatures make it impossible to use insecticides in doses sufficiently strong to be lethal. Advice on the best treatment under the prevailing conditions is given in detail.

1847. BOYCE, A. M., KORSMEIER, R. B., AND DICKINSON, R. C. 634.31-2.78

Control of orange worms.

Calif. Citrogr., 1944, 29: 179.

The orange worm is a collective name for the larvae of 4 small moths of which the orange tortrix, *Argyrotaenia citrana*, is the most injurious to citrus fruit. Control can be obtained by the application of cryolite as a 50% dust mixture at the rate of $\frac{1}{2}$ lb. per mature tree. The cryolite may be included in a sulphur dust thrips treatment, if one happens to coincide or in a DN Dust or in DN Dust D8 for tortrix and red spider, or again in DN sulphur dust in a combined attack on tortrix, red spider and thrips. It is rarely satisfactory as a spray. In California the tortrix dust is applied in late May or early June or at any time during summer. Results on another citrus moth, *Pyroderces rileyi*, have not so far been promising.

1848. MCGREGOR, E. A. 634.3-2.73: 632.951

Toxicity of anabasine to the citrus thrips.

J. econ. Ent., 1944, 37: 78-80, bibl. 5.

Anabasine alkaloid 1:2000 and 1:1000 and anabasine sulphate (40% anabasine) at 1:800 and 1:600, both with and without sugar, were highly toxic to citrus thrips, *Scirtothrips citri*, in laboratory experiments at Whittier, Calif. The material appears to act by contact and by fumigation, though the range is less than half an inch.

1849. PLUMMER, C. C., MONK, J. W., AND SHAW, J. G. 632.76: 634.1/8
Field studies on insecticides for the control of the Mexican fruitfly.
J. econ. Ent., 1943, 36: 904-11, bibl. 9.
Tartar emetic proved greatly superior to copper sucrate and sodium fluosilicate in the control of Mexican fruit fly, *Anastrepha ludens*, on citrus trees, but even spraying with tartar emetic did not reduce the fly population by more than 41.2%, a result commercially quite unsatisfactory. The statistically planned tests were conducted in Mexico.
1850. MOORE, P. W. 634.3-2.954
Oil sprays for weed control in untilled citrus orchards.
Calif. Citrogr., 1944, 29: 246, 251.
Several hundred acres of citrus in San Bernardino County, California, are now under the non-cultivation system, the weeds being kept down by spraying with undiluted low grade heater oil, 28-32 gravity, whenever the weeds reach 4 inches in height or before blooming in the case of low growing plants. The low grade oil is cheaper and more effective than higher grades or than Diesel oil. The most efficient appliances for spraying are those equipped with horizontal booms and also with those attachments that can be used for hand application. Oil spraying is reported to reduce erosion by improving water penetration and as a result of the firmness of the untilled surface. No cover crops are grown and the fertilizers used are not worked into the soil. Growers are unanimous that tree condition is improved, and some think also that yield and quality are better. Plough pans are eliminated in a few years and the oil has not yet had any detrimental effect on the soil. Harvesting and other operations requiring transport are easier and work can be restarted more quickly after heavy rain. No controlled experiments have been recorded.
1851. LOMBARD, T. A. 632.954
Oil weed control—Cultivation versus non-cultivation.
Calif. Citrogr., 1944, 29: 212.
The control of weeds in citrus orchards by means of oil sprays rather than by cultivation methods is advocated. The author having put the matter to the test reports a more satisfactory water penetration and a somewhat smaller requirement of nitrogen on the sprayed plots. There was no noticeable increase of yield after 3 years, but the condition of the trees was fully as good. The advantages are that there is no root disturbance, no trunk injuries, a saving of water by as much as 50% and a reduction of cost in some areas. Plough soles and soil compaction do not occur.
1852. GUNTHER, F. A., AND LADUE, J. P. 634.3-2.951
Determination of oil deposit on citrus leaves by the steam-distillation method.
J. econ. Ent., 1944, 37: 52-6, bibl. 2.
The differences between the adaptation of a (described) steam-distillation method of determining oil deposit on lemon leaves to the quantitative determination of deposits of 2 lighter and 4 standard grades of spray oils and a kerosene adaptation previously described (*J. econ. Ent.*, 1942, 35: 333-9, *H.A.*, 13: 554) lies in the use of diluted phosphoric acid, instead of an aqueous solution of sulphuric acid, nitric acid, and aluminium sulphate as the decomposition medium. A high degree of reproducibility and efficiency is claimed for the method.
1853. KLOTZ, L. J., AND LINDGREN, D. L. 634.3-2.944
Types of fumigation injury on citrus.
Calif. Citrogr., 1944, 29: 245, bibl. 8.
Descriptions and photographs are given of 13 types of HCN fumigation injuries on citrus fruits, leaves or bark.
1854. GUNTHER, F. A., BEIER, R. L., AND LADUE, J. P. 634.3-2.952.1
Determination of sulfur residues from sulfur application on citrus foliage.
Reprinted from *Industr. Engng Chem. (Analytical Edition)*, 1943, 15: 574-5, bibl. 15.
Elemental sulfur (98% sulfur by weight) mixed with a sulfur-free spray oil was applied to lemon leaves and then stripped off with purified carbon disulfide. After removal of the solvent, the sulfur was oxidized to inorganic sulfate by alkali fusion, and the sulfate ion was determined gravimetrically by precipitation as the barium salt. No special apparatus was required, and 10 to 200 micrograms of sulfur per square centimetre of leaf surface were determined rapidly and accurately in field practice. [Authors' summary.]
1855. KENNARD, G. B. 633.492
Sweet potato variety experiments at the Imperial College of Tropical Agriculture, 1927-43.
Trop. Agriculture, Trin., 1944, 21: 69-77.
Summarizes the results of 16 years of experiments and field trials carried out by post-graduate and diploma students in connexion with their courses on agriculture. Interpretation of the results was somewhat hampered by the fact that all the tubers were planted and lifted on the same dates irrespective of the differences in growth periods existing between varieties. Among the varieties tested the largest differences amounted to 28 days. Maturity is assumed when the dry matter content of the tuber remains constant for a significant period. Leaf fall and wilting, generally accepted as symptoms of maturity, are unreliable. The length of the growth period should be definitely established by experiment for each variety for the convenience both of the research worker and the farmer. The local Black Rock and V 52, a hybrid from St. Vincent, were selected as the most promising varieties for yield. All manual treatments increased yield, especially those containing farmyard manure. No difference in yield could be attributed to spacing, except that the total yield for a given area increased as the planting distance diminished, 8 inches between sets being the minimum. Vine production was unaffected by spacing. Sweet potatoes grown during the cloudy, humid period from May to August give a much lower yield than when planted in October when the rainfall has moderated and the humidity is lower. The reasons for this have not been worked out. Many introduced sweet potatoes were deficient in edible qualities. B 20 and B 281 and Black Rock are the best flavoured of the varieties tested. In storage losses are caused by the fungus *Rhizopus nigricans*, by the conversion of starch to cane and reducing sugars and by the transformation of reducing sugars to water and CO₂. Black Rock showed outstanding storage qualities, Jackson and Red Nut failed to store. Most of the others showed good storage qualities, and all stored better in sacks in a room than in clamps or in small uncovered heaps *in situ*. The chief pests are the stem and tuber borer *Megastes grandalis* and a slug *Vaginulus langsdorfi*. These are not effectively controlled, though the slug can be destroyed by meta.
1856. DEPARTMENT OF AGRICULTURE, S. RHODESIA. 633.492
Notes on growing sweet potatoes.
Rhod. agric. J., 1944, 41: 132-4.
Notes are given on the propagation, planting, manuring, harvesting and uses of sweet potatoes in Rhodesia. Of the varieties recommended by the Department of Agriculture for alcohol production only Virovsky is reported to be available at present. Tests conducted at the Salisbury and Bulawayo Experiment Stations have shown that in areas and seasons where rains commence late highest yields are obtained by planting the cuttings between maize rows in January or February, not lifting them until 15-18 months later. The yields of crops thus treated were 3 times as heavy

as those from slips planted in the following December, while the main crop of the first year was not affected.

1857. STEINBAUER, C. E., HOFFMAN, G. P., AND EDMOND, J. B. 633.492
Why are single plant yields of sweet potato highly variable within plots?
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 249-54.

Five tests in three localities during two years, embracing 8,000 individual plant records, could provide no answer.

1858. EDMOND, J. B., AND DUNKELBERG, G. H. 633.492
The influence of "crowded" bedding of roots on plant production of the Porto Rico sweetpotato.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 246-8.

Planting in electrically heated hotbeds twice as many sweet potato roots per unit area of bedding space (600 plants in 36 sq. ft.) markedly increased yield and had no apparent ill effects at the South Carolina Experiment Station.

1859. EDMOND, J. B. 633.492
The effect of exposure to low temperatures on plant production of the Porto Rico sweetpotato.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 259-61, bibl. 3.

Exposure to temperature (40° F.) below the optimum range of storage (55° F.) for 7 days reduced the producing capacity of sweet potato roots at South Carolina Experiment Station. Exposure for 4 days had no ill effects.

1860. DAINES, R. H. 633.492-2.4
Soft rot of sweet potatoes and its control.
Bull. N.J. agric. Exp. Stat. 698, 1942, pp. 14, bibl. 17.

The control of soft rot of sweet potatoes, caused by *Rhizopus nigricans* and 8 other less common *Rhizopus* species, was studied at the New Jersey Agricultural Experiment Station. There are two distinct problems: (1) prevention during storage and (2) control during the post-storage period. Having shown that the optimum temperature for infection lies between 65° and 73-4° F., at a relative humidity of 75-84%, it is recommended that a storage temperature of 55° F. and a relative humidity of 85-90% should be maintained. Conditions during the preceding 10-14 days' curing period should favour wound healing to increase rot resistance by the development of wound cork layers, and a temperature of 80-85° F. with a relative humidity of about 90% is suggested. Just as the adoption of sanitary measures in the storage house is important for success during the first period, careful handling of the crop after removal from storage is essential. Good protection during the next period was obtained by dipping the sweet potatoes, not later than 36 hours after cleaning, in a solution of 20 lb. borax and 10 lb. sodium hydrogen carbonate in 100 gal. water, to which enough emulsified oil was added to give 1.75% actual oil in the dipping material. Not more than 300 bushels should be treated with each 50 gallons of the solution, as its effectiveness decreases in use. The American authorities advise against the use of boron on sweet potatoes that are to be eaten until adequate data on the effect of the residue upon human health are available.

1861. MERRILL, S., Jr. 633.85-1.523
Characteristics in the nursery of tung progenies from open-pollinated seed of 169 parent trees.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 149-54, bibl. 5.

Differences after one year in progeny from 169 open-pollinated tung trees, isolated by 4 miles from other tung, in respect of germination, height, trunk diameter and percentage of branched trees are much greater than might be expected from a single population. It is concluded that the progenies differ inherently in the characteristics studied.

The work was carried out at the U.S. Experimental Tung Farm, Mississippi.

1862. MERRILL, S., Jr. 633.85-1.541.5
The budding of tung (*Aleurites fordii* Hemsl.).
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 227-35, bibl. 1.

The U.S. Field Laboratory for Tung Investigations at Bogalusa, Louisiana, has adopted the late summer and autumn budding of tung as a standing practice. The buds are banked with earth from November till April against cold. The rootstocks are cut back to force the buds as soon as the soil is removed. There is no evidence that one scion clone will produce better stands than another, but there are distinct clonal differences in winter hardiness, and one clone, A-4, tends to make a brittle union with the stock. Certain stocks harden too early in the season to be useful for late budding. Shield budding gave better results than patch budding. Bud take is affected adversely by soil texture, and fertility factors cause a decrease in the growth of seedling rootstocks. There was no difference in take when the petioles were removed at the time of cutting the scion wood and when they were removed 10 days in advance.

1863. DROSDOFF, M., AND KENWORTHY, A. L. 633.85-2.19: 631.811.6
Magnesium deficiency of tung trees.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 1-7, bibl. 7.

A marginal leaf scorch of tung trees, found to be due to magnesium deficiency, was put right by soil applications of Epsom salts for two years at the rate of 8 lb. per tree 10-12 years old and 4 lb. per tree 6-8 years old. Dolomite was only partially successful.

1864. COLLINS, E. R. 634.58
Producing peanuts for oil.
War Ser. Bull. N.C. agric. Extens. Serv. 17, 1943, pp. 16.

An increase in the production of peanut oil being demanded by the Government, the bulletin describes all aspects of peanut cultivation in North Carolina.

1865. ANON. 634.58
Notes sur la culture de l'arachide pour la production d'huile comestible et de tourteaux pour l'alimentation des animaux. (Ground nut cultivation for oil and cake in Mauritius.)
Rev. agric. Maurice, 1944, 23: 26-31.

The cultivation of groundnuts is described with special reference to conditions and practice prevailing in Mauritius.

1866. SHAW, L. 634.58-1.531
Why and how to treat peanut seed.
War Ser. Extens. Bull. N.C. agric. Extens. Serv. 18, 1943, pp. 8.

Investigations conducted at the North Carolina State College of Agriculture and Engineering have shown that the poor stand of peanuts frequently experienced in Carolina is due to seed decay before emergence and that it can be controlled by seed treatment with one of the following dusts at the rate of 2-4 ounces per 100 lb.: Arasan, 2% Ceresan, Yellow Cuprocid, Spergon. The treatment almost doubled emergence as compared with controls. Emergence of shelled seed was greatly superior to that of unshelled samples and hand shelling proved much more satisfactory than machine shelling. The reduced germination resulting from machine shelling was, however, largely overcome by seed treatment.

1867. OOSTHUIZEN, E. A. 634.58-1.56
A novel peanut sheller.
Fmg. S. Afr., 1944, 19: 401-3.

Excessive breakage of peanuts during shelling is avoided with a novel peanut shelling machine in which the shock is reduced to a minimum by the elimination of the beater effect. The design of the new model is described and illustrated by photos and diagrams.

1868. HAAS, A. R. C. 634.62-1.811.9: 546.27
Boron in the palms and soil of date* gardens
in the Coachella Valley of Southern California.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 34-42, bibl. 4.
The soils of date gardens were found to contain adequate
available boron. Solution cultures with date seedlings
showed that with boron deficiency the terminal buds died
and the roots darkened and deteriorated.
1869. DA COSTA, E. W. B. 634.651-2-3/4+ 2.8
Diseases of papaw.
Qd agric. J., 1944, 58: 282-93.
This review of papaw diseases occurring in Queensland is
based on the information accumulated by Departmental
officers. Much importance is attached to the following
cultural methods of disease control: (1) vigorous growth
should be maintained during the winter, (2) great attention
should be paid to soil aeration and drainage. A key to
papaw diseases is presented dividing the troubles into two
large groups: A, Diseases affecting the plant as a whole,
viz. dieback, yellow crinkle, trunk rot, root rot and powdery
mildew; B, Diseases chiefly affecting the fruit, viz. fruit spot,
black spot, *Rhizopus* fruit rot and, again, powdery mildew.
The key is supplemented by a detailed description of each
disease and its control.
1870. (EGGERS, E. R.), AND OTHERS. 634.653
Establishing an avocado orchard.
Calif. Citrogr., 1944, 29: 190-1.
A series of recommendations as a result of a growers'
discussion organized by the L.A. County Farm Bureau,
California. A rectangular system of planting is used on
slopes up to 3-5%. On steeper slopes contours are usually
followed, the contour grades depending on the soil type and
the cross slope. Examples are given of the grading for
different situations and soils. The acreage should be
double planted, the extra trees being taken out as becomes
necessary. Stocky one-year-old nursery trees are easier
to establish than the thinner type. They should be budded
on a known rootstock. Larger trees require more care in
the field to get the same results. Spring and early summer
is to be preferred to autumn planting. The planting hole
should be 6 inches wider than the diameter of the ball, of
equal width at bottom and top and no deeper than the
height of the ball, thus any danger of an air pocket will be
avoided. If a dense subsoil lies too close to the surface,
it should not be dug into, or a water pocket may form. It
may be dug down to and if the tree stands a little high a
mound of top soil may be built round the ball instead.
In moving and planting the avocado tree should be handled
by the ball and not by the stem. The tree is set in the hole
with the bud scar to the north. The hole should only be
filled with well pulverized top soil which should be tamped in
at time of filling if dry, or watered in if wet. The tree must
be watered soon after planting. The excavation of a
cone-shaped basin with the bottom of the cone only slightly
larger than the diameter of the trunk will ensure the wetting
of the ball whereas within the flat basin or furrow the water
may seep into the surrounding soil and leave the ball dry.
After planting the chief hazard is sunburn. Shading is
needed, as a few hours' exposure on a hot day may burn the
bark very severely.
1871. SCHROEDER, C. A. 634.653: 581.141
Multiple embryos in the avocado.
J. Hered., 1944, 35: 209-10.
There is no evidence in the avocado of nucellar embryony
such as occurs in citrus and mango. All the multiple
embryos reported here apparently arise from gametic tissue.
They may be identical or fraternal but should not be
confused with vegetatively reproduced nucellar embryos.
1872. PARKER, E. R., AND ROUNDS, M. B. 634.653-1.62
Avocado tree decline in relation to soil moisture
and drainage in certain Californian soils.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 71-9, bibl. 11.
The necessity for drainage to prevent the decline of avocado
in clay soils where the roots became waterlogged is proved.
1873. FLANDERS, S. E. 634.653-2.752
Control of the long-tailed mealybug on avocados
by hymenopterous parasites.
J. econ. Ent., 1944, 37: 308-9.
Biological control of the long-tailed mealybug *Pseudococcus*
longispinus on avocado in the Carlsbad area, California,
was achieved by the liberation of two hymenopterous
parasites, *Tetraneura peregrynus* and *Anarhopus sydneyensis*.
The transfer of parasitized material from dracena and citrus
trees in other areas was followed very quickly by a reduction
of the pest population. A secondary beneficial effect of
the establishment of the parasites was that it facilitated the
topworking of avocados, the paper bags placed over the
grafts having afforded a perfect habitat for the mealybug.
1874. BARNES, J. W. 635.976+635.977
Some trees, shrubs, shrubby-herbaceous plants,
climbers and water plants suitable for the colony.
Rhod. agric. J., 1944, 51: 145-60, 261-76.
This comprehensive list of trees, shrubs, etc., suitable for
growing in Rhodesia has been compiled by the manager
of the Government Forest Nursery, Salisbury, who is in a
position to add a useful comment to each plant name from
his own lifelong horticultural experience in the Colony.
Apart from information relating to timber the list contains
many suggestions for the planting of ornamentals.
1875. ANON. 634.58
(4) Peanut production in North Carolina.
Extens. Circ. N.C. agric. Extens. Serv. 257,
1942, pp. 4.
KIMBROUGH, W. D. 633.492-1.556.4
Studies of delayed digging of sweet potatoes of
the Porto Rico variety.
Proc. Amer. Soc. hort. Sci. for 1944, 1944,
44: 395-7, bibl. 2.
Motto, "dig before a killing frost".
LARGE, J. R. 633.85-2.4
Web blight of seedling tung trees tentatively
identified as the *Rhizoctonia* stage of *Corticium*
microsclerotia.
Phytopathology, 1944, 34: 648-9.
WINSTON, J. R. 634.34: 581.192
Seasonal changes in the juice of the calamondin
in Florida.
Proc. Amer. Soc. hort. Sci. for 1943, 1943,
43: 84-90, bibl. 8.

TROPICAL CROPS.†

1876. SUMMERVILLE, W. A. T. 634/635(943)
Some aspects of the horticultural development
of Queensland.
J. Aust. Inst. agric. Sci., 1944, 10: 57-65.
This review of fruit and vegetable growing in Queensland
was given as a presidential address to the Queensland Branch

* For shrivel in dates, see 1948.

† See also 1466.

of the Australian Institute of Agricultural Science. It is
remarkable for the optimistic view taken in respect of
possible future developments in both industries. Such
fruits as banana, pineapple, citrus, papaw, passion fruit,
strawberry, avocado, mango, deciduous fruits, grapes and
certain fruit crops of lesser importance are dealt with in
some detail, while the vegetable crops and transport and
market problems receive a more general treatment. The

expansion of each branch of the industry will have to be accompanied by adequate research and extension services. The average gross return per acre in Queensland is given as £55 for fruit, as against £52 for tobacco, £40 for sugar and £11 for the average of all principal crops.

1877. STEPHENS, S. E. 634.1/8: 551.556.1(943)

Fruitgrowing in tropical Queensland.

Qd agric. J., 1944, 58: 343-9.

The information given on citrus, pineapple, banana, papaw, mango, granadilla and grape growing in Queensland relates to such subjects as production centres, marketing conditions, cultivation practices, varieties, etc. Fruits of lesser importance such as passion fruit, plums and persimmons, litchis, avocado and sugar apple are dealt with more briefly.

1878. WARREN, A. L. 634/5: 551.566.1(948.1)

The rural possibilities of a north-western tropical area.

J. Dep. Agric. S. Aust., 1944, 47: 399-402.

The paper was prepared for a meeting of the Coonawarra Agricultural Bureau and discusses the suitability of a tropical area in north-western Australia for the growing of certain market garden crops and tropical fruits.

1879. WATERS, H. B. 63(667)

Agriculture in the Gold Coast.

Emp. J. exp. Agric., 1944, 46: 83-102.

An account by the Director of Agriculture of the agricultural position and policy in the Gold Coast, prepared in 1940, with a memorandum reviewing progress to the end of 1942. The cocoa situation is dealt with at length; cocoa is the staple export crop and under forest conditions gives higher yields in the Gold Coast than elsewhere. The threat to its continuation by *Sahlbergella* and swollen shoot diseases and the measures taken to check their spread are described. Brief notes are given on the many other crops grown. Export of hevea rubber is increasing. Kola cultivation can stand on its own feet. The lime crop is largely purchased by Messrs. Rose & Co. who have established a factory. Export of palm oil has declined from 10,000 tons to 1,000 tons since the beginning of the century and government mills have had to close for lack of supplies. Copra export has declined, but coconut planting has increased. The Department of Agriculture has sponsored the planting of 8,000 acres. The banana trade is run by two European-owned concessions and 250 native farmers and totals 100,000 exported bunches. The quality of export fruit is supervised by the Government and research work is in progress into cultivation methods necessary for continuous supply of large bunches. The suitability of the crop for local farmers has still to be proved. Coffee (*robusta*) can supply local needs but has little chance of developing an overseas trade. Cotton is unprofitable. Grapefruit is grown by the lime growers to the extent of 150 acres, but the fruit is neither seedless nor free from fruit moth puncture and thus cannot be exported. The fruit are purchased for juice by Messrs. Rose. Research on the two disabilities mentioned is in progress with the aid of the Colonial Development fund. Oranges are severely damaged by fruit moths, which attack also tangerines, grapefruit and limes, often to about 90% of the fruit: otherwise they grow well but their green colour is against them for export. The export price of groundnuts is much lower than the local market price, hence the attempt to foster an export trade failed. Cassava, the staple food in the southern part of the Gold Coast, has promise as an export crop. An attempt to establish a castor industry failed owing to low yield. Shea nuts or the extracted butter cost more to prepare than the export price and are, therefore, only used locally. Progeny trials are proceeding. A full scale trial of sisal on plantation lines failed. There is a small tobacco industry in the Eastern Provinces. The agricultural policy as regards the possible improvement of these crops is included in a statement in which the policy is outlined in detail.

1880. STENHOUSE, A. S. 631.459(678.2/9)

Agriculture in the Matengo highlands.

E. Afr. agric. J., 1944, 10: 22-4.

Describes the Matengo pit system of hillside cultivation, evolved by a single tribe in Tanganyika. The system presents the complete answer to the erosion problem. Cultivation is on continuous raised beds made on cut grass laid out in grid pattern. Extraction of the soil to form the beds leaves a series of pits 4 to 5 feet across, as are the beds. During the season the pits fill with silt, weeds and crop residues are thrown in, and finally the old soil beds are split and new beds formed over the old pits, while the new pits occupy the place where the old beds intersected. The crops are maize, peas and beans.

1881. TEMPANY, H. A., RODDAN, G. M., AND LORD, L. 631.459

Soil erosion and soil conservation in the Colonial Empire.

Emp. J. exp. Agric., 1944, 12: 121-53.

The position in regard to soil erosion, including the measures taken to combat it, are reviewed for each dependency in the Colonial Empire. It is noted that since Sir Frank Stockdale's report (*ibidem*, 1937, 5: 281-97) there has been a marked awareness among Colonial Governments of the dangers involved and that in many places considerable progress has occurred in the application of soil conservation methods. With the return of peace the way may be open for achievements on a larger scale.

1882. MILNE, G., AND CALTON, W. E.

631.415.3: 631.51

Soil salinity related to the general clearing of natural vegetation.

E. Afr. agric. J., 1944, 10: 7-11.

An area of low-lying country where sisal has been destroyed by the recent development of surface soil salinity has been examined. A concentration of about 1.5% soluble salts in the surface soil appears to be lethal to sisal. The development of surface salinity is related to a rising water-table, which in turn is related to a disturbance of drainage conditions following extensive clearing of natural vegetation. Remedial measures are outlined and it is suggested that if these measures are practicable there is nothing in the nature of the soils to prevent their being reclaimed and becoming highly fertile.

1883. HIGBEE, E. C. 551.556.1(863)

The Canal Zone Experiment Gardens.

Agric. Amer., 1944, 4: 146-7, 156.

An account of the wartime activities of the Canal Zone Experiment Gardens, Summit, Panama, among which the supply of seeds and seedlings to rubber plantations and the production of abacá, the chief source of Manila hemp, are mentioned.

1884. WALLACE, G. B., AND WALLACE, M. M.

632.3/8(678.2/9)

Supplement to the revised list of plant diseases in Tanganyika Territory.

E. Afr. agric. J., 1944, 10: 47-9.

Approximately 130 diseases from 83 host plants are listed. Most of the hosts are of economic value, though the diseases vary in importance. The revised list, to which this is a supplement, was published *ibidem*, 1937, 2: 305-10.

1885. MAY, A. W. S., AND CALDWELL, N. E. H. 634.1/8-2.77

Fruit fly control.

Qd agric. J., 1944, 58: 224-9.

For the control of the Queensland fruit fly, *Strumeta tryoni*, which causes heavy damage to a great variety of fruits, 3 formulae for lures and 1 formula for a bait spray are given and their application is described. The significance of orchard hygiene and treatment of breeding sources outside the orchard are also stressed.

1886. PLUMMER, C. C. 634.17-2.77

Laboratory studies on the toxicity of tartar emetic to the Mexican fruitfly.

Circ. U.S. Dep. Agric. 697, 1944, pp. 13, bibl. 6.

Field and laboratory tests conducted for many years by the U.S. Bureau of Entomology and Plant Quarantine in co-operation with the Secretaría de Agricultura y Fomento, Mexico, have demonstrated the high toxicity of tartar emetic to the Mexican fruitfly, *Anastrepha ludens*. A solution of 2 lb. tartar emetic—20 lb. granulated sugar in 100 gal. water proved a very effective concentration in cage experiments.

1887. NICHOLS, R. F. W. AND OTHERS. 633.682

Long-term and short-term cassavas.

E. Afr. agric. J., 1944, 10: 56-8.

A symposium and comment on the preferences for long term or short term cassava in various regions in East Africa. Information provided by the Departments of Agriculture in Kenya, Tanganyika and Zanzibar, show that both long- and short-term varieties have a definite place in native economy, depending upon whether the crop is planted as a staple or merely as an alternative source of food supply to be drawn upon during a period of short commons. It is suggested that the origin of both long- and short-term varieties is fortuitous, the former being selected as seedlings by native farmers in districts subject to droughts and famines, whereas in more favoured districts cassava is planted to tide over a relatively short annual dry period, and here long-term cassava would be undesirable, since the land will be wanted for more appreciated annual crops such as maize and rice. Cassava breeding research has now been extended to cover disease-resistance, long- and short-term varieties, bitter and sweet varieties. Meanwhile there appears to be no satisfactory guide to indicate when a cassava plant actually is mature.

1888. ZAHAREIAN, I. L. 633.689

Metabolism and photosynthesis in *Ferula asafoetida* (Rel. Bee. Russian. French summary.)

J. Bot. U.R.S.S., 1943, 28: 237-41.

Ferula asafoetida grows in the deserts of Central Asia. It has a life of nine years; in the first eight growth is vegetative: in the ninth a flowering stem is produced with great rapidity, growing at the rate of about 17 cm. in 24 hours. The tables of analyses show that the roots provide most of the material needed for flowering, but some are also yielded by the leaves. This material consists mostly of sugars and other carbohydrates which are in forms capable of being translocated. *Ferula* is considered as a source of starch.

1889. EDEN, T. 633.72-1.542

Length of pruning cycles under present conditions.

Tea Quart., 1943, 16: 39-41.

The recommendation that in tea plantations the necessary wartime reduction in nitrogen applications should be accompanied by a shortening of the pruning cycle is explained on physiological grounds, namely carbohydrate nitrogen relations. It is thought that the general vigour of the bushes will not be affected by this measure.

1890. GADD, C. H. 633.72-2.76

Does manuring reduce the damage caused by shot-hole borer [*Xyleborus formicatus*].

Tea Quart., 1943, 16: 30-9, bibl. 5.

The object of this experiment, carried out at the Tea Research Institute of Ceylon, has been to test the generally accepted view that a vigorous condition of the tea plant produced by manuring will reduce shot-hole borer damage. For reasons given in detail yield was used as a measure of vigour and the number of broken branches as a measure of the damage done. The tabulated results showed clearly that, contrary to established opinion, highest yields following nitrogen application were associated with the greatest insect damage. Possible explanations are (1) that a vigorous

condition is more attractive to the pest, (2) that nitrogen treatment made the branches more fragile. It is hoped that the continuation of the experiment will throw further light on the problem.

1891. MARSH-SMITH, E. C. 633.72-2.51

Tea weeding.

Tea Quart., 1943, 16: 42-5.

A grower, who has tried selective weeding on his tea plantation for more than 12 years, records his experiences and shows that some weeds, particularly lime weed, *Polygonum nepalense*, may have a beneficial effect. Being very shallow-rooted this weed is harmless to the tea bush, but keeps other weeds down, prevents soil erosion and provides humus. A similar effect is ascribed to Spanish needle, *Bidens chinensis*, whereas it is advisable to keep *Drymaria* in check. Figures are given for the cost of annual weeding per acre for the period 1926-43 and a simple method of rotting down a large amount of weed spoil is described.

1892. COFFEE BOARD OF KENYA. 633.73

Report of Proceedings of Kenya Coffee Conference, June, 1944.

Mon. Bull. Coff. Bd Kenya, 1944, 9: 76-83.

The proceedings were largely concerned with a discussion of the Report of the Marketing Committee which recommended the post-war control of the marketing of Kenya coffee by a committee of growers, when present Government control has been removed. The Report was approved subject to the insertion in any legislation of a clause to provide that the legislation shall terminate at a future date unless it is the wish of the Industry, determined by referendum, that it shall continue. In the matter of insecticides the Home Government was urged by a unanimous resolution, in view of the fact that pyrethrum powder is still being used for agricultural purposes in U.S.A., to release sufficient of the powder (20-25 tons per annum) to deal with severe depredations of antestia and capsid in Kenya. In some cases almost 50% of the crop had been lost.

1893. RAYNER, R. W. 633.73: 581.1

Simple botany applied to the coffee bush.

Mon. Bull. Coff. Bd Kenya, 1943, 8: 106, 108, 115, 118; 9: 17-8, 30-1, 60-1, 68, 69, 90, 91, 98-9.

A brief summary of basic physiological principles and their application to the coffee bush.

1894. MORALES GIRON, J. F. 633.73-1.537

Almácigos de café. (Coffee nursery work.)

Rev. agric., Guatemala, 1944, 21: 1-2: 11-24.

Nursery practice in the raising of coffee seedlings for estate planting needs considerable improvement in Guatemala. Some growers are even dependent on chance, self-sown seedlings for their supply. This article gives instruction in the lay-out and maintenance of such a nursery. The paper is well illustrated with coloured plates showing the plants in various stages of development. A healthy coffee plant, 10 to 12 months old, should have produced 4 laterals and still have the cotyledons attached. At 15 months, a good nursery tree in perfect health should have 8 laterals, have lost its cotyledons but still preserve its first seed leaves.

1895. MENDES, J. E. T. 633.73-1.543.1

O sombreamento e os cafezais paulistas. (Shade and São Paulo coffee.)

Bol. Superintend. Serv. Café, São Paulo, 1944, 19: 257-67, bibl. 8.

Coffee in São Paulo, Brazil, is grown without shade. The advantage of shade is that by reducing yield it prevents overbearing with consequent irregular bearing and dieback. In São Paulo the same result is achieved by planting up to 6 or more bushes in one hole. The method also gives wind resistance. Coffee, however, is failing all over the country, erosion being one of the causes. Its cultivation

has been abandoned in neighbouring provinces, causing much financial loss and unemployment, and that of São Paulo looks like going the same way. The author considers that if the derelict coffee ground were replanted and shaded with sufficient trees to provide humus from their leaf fall, to prevent erosion and, in the higher altitudes to which coffee seems steadily to be retreating, to act as a protective against frost, the plantations would again thrive. The genus *Inga* contains at least 250 species, of which about a dozen are used as shade trees in various parts of S. America and the West Indies. Assuming this genus is selected for similar use in São Paulo, the choice of species requires care. For instance *Inga wuaguiensis* will produce a root over 50 feet long in 3 inches of soil while others suffer severely from pests and diseases. *Inga edulis* is one of the most promising, being extensively used for shade in Colombia, Venezuela and Central America generally, and it is one of the two species found wild in São Paulo. Trial plantings have been made at Ribeirão Preto and other Experiment Stations. *Albizia malacocarpa* and *Tipuana speciosa* are doing useful work as shade trees in certain localities and are now undergoing official trials. The latter is of particularly rapid growth. The effect on the coffee borer would have to be considered, since the indications are that shade increases its population. However, it could probably be kept down in new shaded plantations if the bushes were planted singly, and picked clean at least 2 or 3 times a year.

1896. POSNETTE, A. F., AND PALMA, M. 633.74
Observations on cacao on the Paria peninsula,
Venezuela.

Trop. Agriculture, Trin., 1944, 21: 130-2.

An account of 10 days study of the cacao of the Paria peninsula, Sucre State, Venezuela, in March-April 1944. Cross pollination as in Trinidad and by the same insect (*Ceratopogonid* midge, *Forcipomyia* sp.) is probable. There is a very low incidence of witches' broom disease (*Marasmius perniciosus*) and no precautions are taken against it. A few trees were heavily infected, the neighbouring ones being clean, and it is suggested that most of the trees are highly resistant except for pod infection. Removal of infected trees would probably raise yields by 5% by eliminating the source of pod infection. Virus diseases, the search for which was the main object of the senior author's visit, were rare, though a possible new one was discovered and is described. Its incidence is very slight. There is a serious disease of the common shade tree *Erythrina corallodendron* which is unknown in Trinidad. The symptoms are the appearance of many brooms, the result of prolific bud stimulation, on the branches, followed later, when the broom dies, by extensive die-back of the branches and the death of the tree in from 6 months to 2 years. No fructification or mycelium were found on the brooms. The brooms may be a symptom of a systemic virus infection. The loss of these shade trees is regarded as a calamity of the first magnitude and planters in Trinidad, where the disease has not so far appeared, are urged to use another species—*Erythrina glauca*, for instance, seems to be immune—or to plant a mixture of shade trees.

1897. HUMPHRIES, E. C. 633.74: 581.144.4
A consideration of the factors controlling the
opening of buds in the cacao tree (*Theobroma*
cacao).

Ann. Bot. Lond., 1944, 8: 259-67, bibl. 10.

Observations conducted at the Imperial College of Tropical Agriculture, Trinidad, indicate that flushing in cacao is controlled by maximum shade temperatures. When the maximum air temperature, measured in a Stevenson screen under the trees, rose above 83° F. conditions were apparently favourable for renewed bud activity. None of the other factors tested showed any relationship to flushing frequency. About 7 weeks was the minimum resting period required by a cacao bud.

1898. POSNETTE, A. F. 633.74: 581.162.3

Pollination of cacao in Trinidad.

Trop. Agriculture, Trin., 1944, 21: 115-8, bibl. 11.

The literature on pollination of cacao published since 1937 is reviewed with special reference to the importance of the *Ceratopogonid* midge *Forcipomyia* sp. The behaviour of the midge is described and its efficiency as a pollinator is estimated, the conclusion being reached that this midge is responsible for most of the effective pollination of cacao flowers in Trinidad.

1899. POSNETTE, A. F. 633.74-2.8

Virus diseases of cacao in Trinidad.

Trop. Agriculture, Trin., 1944, 21: 105-6, bibl. 4.

Two viruses, or virus strains, have recently been discovered in Trinidad cacao, the first to be reported for cacao other than the swollen shoot disease of the Gold Coast. Until cross-immunity tests have proved them to be related, the viruses are provisionally named red mottle virus and vein-clearing virus. The red mottle virus is distinguished by the appearance of red pigment along the sides of some of the main veins in the leaf after the leaf itself has reached the stage in its development when it turns from red to green. The mottle also in some clones appears on young pods until two-thirds grown and provides a useful symptom for diagnosis. The red mottle is accompanied by patchy clearing of some of the veins. There is some mosaic. Transmission by grafting was possible in half of the 22 experiments, the average incubation period being 98 days. Vein-clearing virus produces a much greater degree of clearing than red mottle, extending to the fine veins and forming a yellow network over the leaf, and the clearing does not break up into spots. No yellow mosaic occurs. The 4 transmissions attempted all succeeded, the incubation period being shorter than that of red mottle. At River Estate, where the disease was first observed, the rate of spread which will certainly accelerate, is even now rapid enough to be regarded as serious.

1900. BOX, H. E. 633.74-2.754

The *Sahlbergella* menace to Gold Coast cocoa.

Mem. Gold Coast Dep. Agric. Cocoa Res. Sta.

Tafo 9, 1944, pp. 8, 9d.

An account of the struggle against *Sahlbergella singularis* (brown capsid) and *S. theobroma* (black capsid), two pests which are causing serious injury (20% of the total annual production) to Gold Coast cocoa. Whole areas are devastated by brown capsid and replanting is impossible because of black capsid which specializes in seedlings and the herbaceous shoots of young budded trees. Taken in conjunction with the rapid spread of swollen shoot virus, the cacao industry, which supports the greater part of the Gold Coast peasantry, is in considerable danger. To quote from the 1st Annual Report of the Tafo Station, "The terrible effects of die-back and *Sahlbergella* are known to all agriculturists in the cocoa area. A healthy-looking farm in a few years is reduced to a stag-headed array of almost leafless trees." The life cycle of the insect is outlined. The only possible methods of control are the production of resistant varieties, a matter of years even if successful, or the discovery of some parasite which can deal with the pest. An organized attack on these lines is in process of formation.

1901. CHEESMAN, E. E. 633.74

Progress report on field experiments of the

botanical section to August 1943. General notes

on experiments CRB.1 to CRB.6.

11th Rep. on Cacao Research, 1941-43, I.C.T.A.,

Trinidad, 1944, pp. 4-15.

A progress report on 6 field experiments of which the lay-out etc. was described in the 10th A.R. on Cacao Research for 1940, pp. 3-11. The object of these experiments is to combine comparison of Imperial College Selections with comparison of various methods of vegetative propagation. A note is given of 4 further experiments supplementary to the above.

1902. McKEE, R. K. 633.74-2.76
The incidence of cacao beetle damage on some I.C.S. clones planted at River Estate.
11th Rep. on Cacao Research, 1941-43, I.C.T.A., Trinidad, 1944, pp. 15-7, bibl. 2.

In a locality (River Estate) severely infested with cacao beetle (*Steirastoma depressum*) trees of the I.C.S. 8 clone were only slightly attacked, I.C.S. 6, 1 and 3 were moderately and I.C.S. 4 and 5 severely attacked.

1903. McKEE, R. K. 633.74
Some observations on I.C.S. clonal material at River Estate.
11th Rep. on Cacao Research, 1941-43, I.C.T.A., Trinidad, 1944, pp. 17-21.

Observations were possible for the first time on the botanical behaviour of young clonal cacao trees. The period was August 1940 to May 1942. Marked periodicity was shown, not only in leaf and shoot growth but also in flowering and in the wilting of the young cherelles. Without further study no direct relationship of cause and effect could be established. The weather regulates flushing to some extent, but other factors are also concerned. For instance early flushing of twigs has been induced by stripping the leaves. It is suggested that there is some factor connected with the leaves which inhibits flushing until reserves have been elaborated and that abnormal stripping of the leaves releases the inhibition. A tree which flushes frequently becomes weakened and liable to insect and fungal attack. The need for understanding the external and internal factors connected with flushing is obvious.

1904. HUMPHRIES, E. C. 633.74: 581.145
Studies in the physiology of *Theobroma cacao* with special reference to cherelle wilt.
11th Rep. on Cacao Research, 1941-43, I.C.T.A., Trinidad, 1944, pp. 23-7, bibl. 6.

The data obtained indicate that the growth period of the cacao fruit occupies 170 days and falls naturally into 2 phases:—1. A development phase lasting 75 days and divided into 2 periods, (a) 1 to 50 days, at the end of which division of the zygote occurs; (b) 50 to 75 days beginning with the division of the zygote and showing metabolic changes associated with the preliminary development of the embryo. 2. Phase of active metabolism and maturation in 3 periods; (a) 75-87 days: beginning of sucrose formation, maximum fructose percentage and diminishing glucose; (b) 87-143 days: falling fructose percentage, constant glucose, rapidly accumulating sucrose and starch; (c) 143-170 days: increasing fructose and decreasing glucose in the pod wall; increasing pulp sucrose and starch in the pulp; glucose and fructose again become equal. No fat is present in the testa at maturity. Changes in the mineral content of the pod wall and pulp are also noted.

1905. HUMPHRIES, E. C. 633.74: 581.144/5
Dormancy of cacao buds. I. A consideration of the factors concerned in the breaking of the rest period.
11th Rep. on Cacao Research, 1941-43, I.C.T.A., Trinidad, 1944, pp. 28-32, bibl. 9.

HUMPHRIES, E. C., and McKEE, R. K.
II. Carbohydrate changes during development of a flush.

ibidem, pp. 33-6, bibl. 1.

HUMPHRIES, E. C.

III. The relationship between bud-bursting and growth of the whole tree.

ibidem, pp. 37-8, bibl. 5.

I. Evidence is presented to show that maximum temperature is closely correlated with bud-burst in cacao.

II. Carbohydrate changes in the young flush during development and the concurrent changes in the next immediately older flush show that total reducing sugars remained

constant. Sucrose content, possibly influenced by maximum air temperatures, fluctuated strongly. Starch was depleted with the start of the young flush and is not fully regained till the 11th or 12th week, successive flushes if occurring frequently, say every 8 weeks, become progressively smaller and weaker. There was a marked increase in alcohol and soluble material in the stems towards the end of the period. The cause is not known.

III. Unlike temperate trees, in which cambial activity is initiated in the trunk some time after leaf development begins and continues more or less throughout the growing season, tropical trees have periodic bursts of cambial activity associated with leaf development. A study of the association of cambial activity of the cacao tree with flower formation and development is important, especially as the cacao flowers originate directly on cushions on the old bark.

1906. BILLARD, J. J. 633.77
Economía de la industria yerbatera Argentina. (The maté industry in Argentina.) [English summary 1 p.]
[Publ.] *Inst. Econ. Legis. rur. B. Aires, 1944, 5: 181-309, bibl. 32.*

Argentina is now the largest producer and consumer country of yerba maté (*Ilex paraguariensis*), having overtaken Brazil in production in 1936. The consumption of maté is mainly confined to S. America. In U.S.A. and Europe it is little known. In 1937 the area under cultivation in Argentina was 63,165 ha. bearing a total of 65,518,746 plants. Laws controlling production have prevented further increase. The production zones of the Territory of Misiones are classified (field, mixed and woodland). The cost of production on the plantation is analysed and determined as 0.186 dollars or 0.181 dollars per kg. according to whether the processing of the yerba is done individually or collectively. In 1942 the consumption per head of the population in Argentina amounted to 8.508 kg., the consumption for coffee, tea and cacao being 1.686, 0.497 and 0.153 kg. respectively. Market prices and customs are discussed and the bulletin concludes with an account of the economic crisis which has existed in the industry since 1930 and the measures taken to deal with it.

1907. IPPISCH, F., Jr. 633.822+632.951
Mentha arvensis y *Pachyrhizus palmatolobus*. (Cultivation of mint and the yam bean in Guatemala.)
Rev. agric. Guatemala, 1944, 21: 1-2: 30-9.

The mint is grown for its oil and the yam bean for the comestible sugary flour extracted from its tubers. The seed beans contain an active principle which is under study as a possible insecticide at Cornell University and at Geneva Experiment Station, N.Y. The yam bean grows wild in Guatemala and could easily be cultivated. It is extensively grown for its tubers in China and Mexico. The approved methods of growing mint in Guatemala are described. Cultivation of the yam bean is still in the experimental stage here and is not dealt with.

1908. ALEMAR, C., Jr. 633.825
Las probabilidades de la producción de jengibre en Puerto Rico. (Ginger prospects in Porto Rico.)
Rev. Agric. Puerto Rico, 1944, 35: 25-7.

Ginger is suggested as a suitable crop for export from Porto Rico. The Mayagüez Experiment Station is carrying out trials with imported Chinese and Jamaican varieties, the local form producing roots which are too small to be acceptable in commerce. In Porto Rico the trials have shown that these gingers grow well on light, well-drained clay or sandy loam deeply ploughed and with a large amount of well rotted vegetable matter or yard manure added. The beds when planted should be covered with straw or trash which will keep down weeds, prevent erosion and prove generally beneficial. On account of the considerable soil disturbance entailed in planting and lifting the crop, the

planting of steeply sloping land should be avoided or erosion may result. Soils low in potash should be manured with a fertilizer containing potassium. The best results have been obtained when this is sown in the planting furrow and covered with an inch of soil before the sets are put in. The sets are then covered with 2 to 3 inches of soil. In Porto Rico planting can be carried out after the rains from March to June. The planting sets are about 2 inches in length and weigh about 1½ oz. Spacing is 1 ft. by 1½ to 2 ft. If no covering of plant debris is available the plants will have to be earthed up with a few inches of soil or the roots may be denuded by rain. Roots can be dug in February or left in the ground if the current price is considered unsuitable, but in the latter case the ground must be dry. Leaving the roots in the ground for a second year does not result in a proportionate increase in yield. Lifted roots can be stored in sand for 7 or 8 months. On final removal the roots should be at once washed in running water and scraped, without damaging the oily layer beneath the epidermis. They are put to soak all night, washed in lime water, and then at once sun dried.

1909. AUSTIN, C. J. 633.88
Leprosy treatment at Makogai (Fiji). Chaulmoogra oil.
Crown Colon., 1944, 14: 581.

The Makogai Leper Station can now produce about half its requirements of chaulmoogra oil (*Hydnocarpus*), the local product being preferred by the patients as less irritating than imported oil. Free seeds are presented to anyone in Fiji who will undertake to grow the tree. It begins to fruit when 3 years old and should be in full bearing at 5 years.

1910. NEČAEVA, N. T. 633.88
Scientific notes—Observations on *Eminium lehmannii* (Bge.) O. Ktze. in the Kara Kum.
[Russian.]
Sovetsk. Botan., 1943, No. 3, pp. 28-30.

Eminium lehmannii, which occurs not only in the sands of the Kara Kum but also in the loess and scree in most parts of Central Asia, as well as in Afghanistan, has been studied at the Turkmen experiment station of animal husbandry, where it is believed to be a possible source of pharmacological material, being known to contain, among other things, poisonous alkaloids. A botanical description is given of the plant, which is adapted to dry conditions. Its vegetative period lasts from early February to mid-April. In addition to its bulb, containing a store of nutrients and a milky juice of acrid flavour, it possesses bladder-like appendages, which are hollow and contain a fluid appreciated by the local shepherds for its pleasant flavour and refreshing properties. The walls of these appendages are thin, and the number of them produced by a plant may be between 1 and 5, each up to 6 cm. long and 1.5 to 2 cm. in diameter. The author has never noticed any references to these appendages, except by his colleague, Mosolov, who was the first to discover them in the Kara Kum. The plant is easily propagated by means of the bulbs and is therefore believed to offer no difficulty in cultivation. Grazing animals avoid it. Turkoman hunters use the bulbs as a poisonous bait for foxes. Marmots, however, eat the bulbs, and tortoises the leaves.

1911. PFEIFFER, N. E. 633.88.51: 581.162.3
Prolonging the life of *Cinchona* pollen by storage under controlled conditions of temperature and humidity.
Contr. Boyce Thompson Inst., 1944, 13: 281-93, bibl. 24.

At a temperature of 10° C., in darkness, and at a relative humidity of 35-50% *Cinchona* pollen was found to retain its viability for a year in a percentage of the grains (5-19 per cent. average). Data for the germination power under other storage conditions are given and it is noted that vacuum storage failed to prolong the life of the pollen.

1912. LANGFORD, M. H. 633.912-2.4
Science's fight for healthy Hevea.
Agric. Amer., 1944, 4: 151-3, 158.

The results obtained from research work on leaf blight control in *Hevea*, caused by *Dothidella ullei*, which was begun in 1940 by the U.S. Department of Agriculture in co-operation with several commercial companies and 14 Latin American countries, have made it possible to grow healthy rubber trees in plantations from Costa Rica to Peru. This success was achieved by a combination of disease control with fungicides and selection of resistant clones. Spraying tests conducted in Panama have shown that 2-4 applications per month of a spray containing 2 lb. of an "insoluble" copper fungicide and a small amount of spreader per 100 gal. will protect susceptible seedlings in the nursery. As high-yielding resistant clones are not yet available, the seedlings are budded first with high-yielding, blight-susceptible clones and later top-budded with resistant clones at the approximate age of 1 year. Spraying, which may be confined to the young leaves, is discontinued after top-budding. The preservation by spraying of high-yielding, susceptible trees for breeding purposes was also shown to be feasible. The search for high-yielding resistant trees is, of course, being continued. The testing of clones for blight resistance is carried out at the Co-operative Rubber Plant Field Station at Turrialba, Costa Rica, where ideal conditions for the development of the fungus exist.

1913. SCHACHAMEYER, C. 633.912-1.55
Contribution à l'étude de la variabilité de deux caractères principaux de l'hévéa cultivé. (Study of variability of two important characters in cultivated hevea.)
Bull. agric. Congo belge, 1942, 33: 182-201.

Intraclonal variability in yield is pronounced in some clones. Three years' observation of grafted plants is long enough to provide sufficient data on which to select the higher yielding individuals. Yield varies from month to month for each tree, being lowest in March-April (Belgian Congo) and highest in November-December. In 96 trees from 24 clones observed over 4 years and presumably tapped alternate months the concentration of latex in all except 10 trees showed a weekly reduction, the average dry rubber obtained falling from 34.2% in the first week to 26.7% in the fourth. There is considerable intraclonal variation in girth at a given age and a table provides various data for 27 clones at about 4½ years of age. Taking the 22 clonal plots as one, the mean circumference is 48.99 cm. with a standard deviation of 6.88 cm. or 14.04% of the mean. The probable age at which certain clones become tappable is calculated and ranges from 3½ years to 6 years according to variety. The characters of a number of clones are briefly described.

1914. I.N.E.A.C. 633.912-2.118
Résistance au vent des clones d'hévéa dans la région de Yangambi. (Wind resistance of hevea clones in the Yangambi district.)
Bull. agric. Congo belge, 1941, 32: 69-82.

It is pointed out that certain *Hevea* clones develop more wind resistance in one country than in another, for instance TJ1 breaks easily in Sumatra and East Java but is more resistant in Malaya and West Java. The powers of wind resistance of clones of Far Eastern origin growing in the Belgian Congo was examined. The conclusions arrived at regarding individual clones must be considered as provisional in view of some contradiction in the evidence. It was found that there was more wind resistance in plantations in which the lines ran parallel to the prevailing winds. Trees giving high yields were less resistant than those of low productivity. Provided that the tapping panel is uninjured a broken crown only puts the tree out of production for a year or two. With regeneration of the crown the yield is as high as before. A table is presented showing the percentages of reduction of yield of dry rubber per annum

through wind damage, which may be expected for each of 9 clones. Clonal characters of resistance do not emerge till the third year. Most damage occurs with trees having a girth of 30 to 60 cm.; larger and smaller trees escape. A number of clones are subject to trunk curvature when very young, sometimes almost so as to touch the ground. Slight curvatures will correct themselves, others, especially if they exceed 12 to 15 degrees from the vertical, need staking. After 4 years of age the trunk is sufficiently rigid to stand alone.

1915. TEIXEIRA, L. P. 633.912-1.541.5
Enxertia da seringueira. (Budding *Hevea braziliensis*.)
Bol. Minist. Agric. Rio de J., 1942, 31: 25-34.

The establishment of a nursery for maintaining a supply of budded *Hevea* is fully discussed. Special attention is paid to processes of budding, which are illustrated. The method known as the Forkert method of patch budding proved to be the most suitable for *Hevea*.

1916. RUBBER RESEARCH SCHEME (CEYLON). 633.912-2.411

The control of bark rot and canker bark rot.
Advis. Circ. Ceylon Rubb. Res. Scheme 21, 1944, pp. 4.

The causal agent of bark rot of *Hevea* is *Phytophthora palmivora*. A successful preventive measure is the periodical application of a phenolic disinfectant to the susceptible area of bark immediately above the tapping cut. Suitable disinfectants of this nature are sold locally under proprietary names which are not here mentioned. The so-called claret-coloured canker in which the active patches on the bark exude a flow of latex or a reddish or purplish liquid in wet weather, is also caused by *Phytophthora palmivora* on stem or branches. The recognized treatment is excision of all discoloured cortex and a round of this canker scraping during the resting season should suffice to control the disease on most estates. A water-soluble, diluted disinfectant applied to the canker patches a few weeks before scraping will greatly assist the scaling off of the diseased bark. Such a disinfectant should also be applied after scraping when this is done in wet weather. Exposed wood surfaces must be tarred. A canker from which a *Phytophthora* has been isolated has been reported for the first time on newly tapped bark at Nivitigalakela Experiment Station. It is easily controlled in the usual way. Clonal susceptibility may be marked in low-country districts. The reactions of a number of clones are described briefly.

1917. RUBBER RESEARCH SCHEME (CEYLON). 633.912-2.421

Oidium leaf diseases [of *Hevea*].
Advis. Circ. Ceylon Rubb. Res. Scheme 22, 1944, pp. 2.

Control of *Oidium* leaf diseases is effected by periodical application of sulphur dust to the foliage. Dusting should be started in mid-country districts as soon as 10% of the trees have started to refoleiate and should be continued at 7-10 day intervals until the foliage has passed the susceptible stage. In low-country districts the preliminary round should be delayed till 25% of the trees have started to refoleiate because complete control leads to increased fruit setting and therefore to increased *Phytophthora* attack, the fruits forming centres of infection. Manuring is liable to increase *Oidium* attack owing to later wintering of manured trees. It is useful in assisting trees to recover from the effects of *Oidium*.

1918. MORSTATT, H. 632.3/8: 633.912+633.73
Beiträge zur Wirtschaftsgeschichte tropischer Kulturpflanzen und ihrer Krankheiten. I. Der Parakautschuk. II. Der Kaffee. (Contributions to the history of tropical economic plants and their pests and diseases. I. Para rubber. II. Coffee.)
Kolon. Rundschau, 1943, 34: 14-22, 79-88, from abstract *Zbl. Bakt. Abt. II*, 1944, 106: 209-10.

The profound effect of rubber and coffee pests and diseases on the economy of the tropics is shown.

1919. AGUILAR G., J. I. 633.913
El hule y nuestra flora. (Rubber bearing plants of Guatemala.)
Rev. Agric. Guatemala, 1943, 20: 10, 11, 12: 19-33.

There are many rubber-bearing trees and shrubs native to Guatemala and a number of them are described and their properties, where known, are discussed.

1920. SCHROEDER, C. A. 634.413: 581.162.3
Hand pollination studies on the cherimoya.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 39-41, bibl. 2.

Hand pollination of the cherimoya (*Annona cherimola*) was found at the University of California to be a practical and effective means for increasing fruit set. It is necessary to wait until the leaves are out before pollinating. Those trees which flower before the leaves are out will not set fruit till they appear. The pollen is very susceptible to desiccation and is almost impossible to store. The ineffectiveness of pollinating old or second staminate stage flowers suggests that dichogamy exists under Southern Californian conditions. Unskilled workers can pollinate 1,500 flowers in 10.5 man hours, the cost being less than 1 cent per fruit.

1921. WILLIAMS, C. H. B., AND CHAN CHOONG, P. A. 634.421

Guava yields in British Guiana.
Trop. Agriculture, Trin., 1944, 21: 67-8, bibl. 3.

With a view to discovering whether the cultivation of guava in British Guiana could be profitably carried out with seedling material grown as a plantation crop, the seedling progeny from 6 trees from various points in the County of Essequibo was raised and planted out, receiving no manure and no cultivation beyond an occasional cutlasing of the weeds. Trees began to bear about 2 years after transplanting or when 3 years old and gave 2 crops a year, each crop being harvested over a period of 8 weeks. There was considerable variation in size and yield even between the seedlings of any one parent, and it was evident that the average yield of trees from one parent might be more than double that of trees from another. A yield of 10,000 lb. per acre might be expected from unmanured trees from a good parent, which would be remunerative even at one cent per lb. Yields from the best trees were 56% above the average for all trees and 200% above the average for the worst, hence it is suggested that blocks of vegetatively propagated high yielders should be established to ascertain whether pure stands of high yielders can be obtained in this way. The spacing advocated is 14 × 14 ft.

1922. BHAT, S. S. 634.441-1.521
Classification of mangoes.
Curr. Sci., 1944, 13: 135-6.

It appears from a study of 25 grafted mango varieties and 107 seedling trees grown in the Baroda State that certain morphological characters may serve as criteria for the scientific classification of the more than 500 named mango varieties in India.

1923. HOPKINS, J. C. F. 634.441-2.4
Diseases of fruit, flowers and vegetables in S. Rhodesia. 4. Mildew of mangoes.*
Rhod. agric. J., 1944, 41: 194-5.

Although the mildew fungus (*Oidium* sp.) causes substantial losses in Rhodesia, its occurrence is often inconspicuous and the ensuing damage is therefore wrongly attributed to other causes. Symptoms and control measures—various applications of sulphur dust or spraying with colloidal sulphur—are described. The disease is favoured by hot dry weather at the time of flowering.

* Exact reproduction of article first published *ibidem* 1941, 38: 470-1, H.A., 12: 261.

1924. VANDERWEYEN, R. 634.6
L'élimination des *pisifera* ou stériles dans les palmeraies issues de croisements *tenera* × *tenera*. (Elimination of sterile oil palms from *tenera* hybrid plantations.)
Bull. agric. Congo belge, 1942, 33: 114-22, bibl. 3.
The oil palm seeds (*Elaeis guineensis*) issued by the Yangambi Experiment Station are the product of crossing the variety *tenera* or soft shell type with itself. The seedlings which result consist of 25% of *dura* or hard shell type, 50% *tenera* and 25% *pisifera* (steriles). The last are worthless. The elimination of steriles from a 4-year-old palm grove planted 8 m. × 6 m., or 203 trees per hectare, is said to have resulted in an increased yield totalling 4,800 kg. per hectare in 12 years. The sterile palms can be distinguished by the production, when quite young, of large numbers of bunches of aborted fruit. At 5 or 6 years old some fruits may reach maturity but they are without kernels and contain only a cavity 2 to 3 mm. in diameter. When the palms are about 8 or 9 years old the bunches bear a few fruits containing a kernel but no shell. This is the typical *pisifera* fruit, but many trees carry nothing but bunches of rotting inflorescences. Another striking characteristic is the luxuriant foliar development compared to that of *dura* and *tenera*. This shows itself at an early age and becomes accentuated with time. *Pisifera* of 6 or 7 years of age can be picked out at a distance by their superior development. Elimination of steriles should not be carried out till the 5th year. They do not incommode their neighbours and serve to shade the soil, besides being then easier to identify. If, however, it is intended to replace the steriles with bearing trees, which is done if density is below 143 trees to the hectare or 9 m. × 9 m. spacing, the steriles should be taken out as soon as possible in order that there may not be too great a difference in size between the standing trees and the replacements. In practice this should be possible in the 4th year of the plantation. Nurseries for growing replacements should be established in the centre of the plantation when the latter is 2 years old. A large ball of earth on the roots and only light pruning are the safety requirements for transplants.
1925. BEIRNAERT, A., AND VANNECK, C. 634.6
Une contribution à la sélection de l'*Elaeis guineensis* J. Est-il possible de distinguer des plantules de *pisifera* dans un mélange de plantules des trois types ? (Can sterile *pisifera* oil palms be distinguished in seed beds of *Elaeis guineensis* ?)
Bull. agric. Congo belge, 1942, 33: 217-27.
Three types of oil palm are involved, arising from the *tenera* × *tenera* cross which provides the seed for new plantations. These types are 50% *tenera*, 25% *dura* and 25% *pisifera*, the latter being sterile and useless. No indication of identity was given by vigour in the seedbed or by anatomical or cytological examination. It was hoped that the S and O₂ content of the leaves of the three types might provide a guide but this too proved unreliable. Facts which came to light during the analyses show that the silica content is higher in the roots than in the leaves and that it increases with the age of the leaf whereas the content of other mineral elements in the leaf decreases.
1926. BHAT, S. S. 634.66
The wood apple.
Ind. Fmg., 1944, 5: 17-8, bibl. 4.
The utilization of kavatha (*Feronia elephantum*) fruit, which is abundant under almost all conditions prevailing in the Indian plains, has been studied at the Fruit Preservation Laboratory, Baroda. The fruit is rich in acid and pectins and the jelly made from it at the laboratory is described as exceedingly agreeable. Kavatha syrup has also been prepared and a further utilization of the fruit as chutney is contemplated. It is suggested that regular plantations of kavatha trees should be raised in waste areas, which could be done at nominal cost.
1927. MASEFIELD, G. B. 634.771
Some recent observations on the plantain crop in Buganda.
E. Afr. agric. J., 1944, 10: 12-7.
The observations cover the average acreages per holding and per taxpayer in various districts, the main types of plantains and their characteristics, the varieties within each type—which are very many in some cases—, resistance to banana weevil, food value, cultivation and economics. The most urgent agricultural problem is the widespread deterioration of banana lands.
1928. MEREDITH, C. H. 634.771-2.3/4
The antagonism of soil organisms to *Fusarium oxysporum cubense*
Phytopathology, 1944, 34: 426-9, bibl. 8.
At Kirikilands Laboratory, Jamaica, B.W.I., 122 soil organisms, mostly actinomycetes, exhibited antagonism in greater or less degree to *Fusarium oxysporum cubense*, the Panama disease of banana.
1929. TIDBURY, G. E. 634.774
Pineapple experiment in Zanzibar. II.*
E. Afr. agric. J., 1944, 10: 40-2.
Manurial and spacing trials with pineapples have been carried on by the Department of Agriculture, Zanzibar, for 4 years. It was found that sulphate of ammonia increased the number and size of fruits produced, but had no effect on the number of fruits for the second ratoon crop. Sulphate of potash decreased yield the first year but had caused increases by the fourth year; these were greater when nitrogen was present. Close spacing increased number but decreased size of fruits but these differences in average size were not found under continuous ratooning, when all plots showed some deterioration.
1930. JARVIS, H. 634.774-2.752
Pineapple scale.
Qd agric. J., 1944, 59: 26-9.
The life history of the pineapple scale, *Diaspis bromeliæ*, as well as the nature and extent of infestations in Queensland are described. As a precautionary measure growers are advised to draw their supplies of planting material from areas where the scale has not occurred, and to give preference to two-year-old stands which have just completed bearing their first crop of fruit. The pest is easily killed by white oil emulsions, but only a proportion of the scales are reached by spraying.
1931. STEPHENS, S. E. 635.1/7(943)
Vegetable-growing in North Queensland.
Qd agric. J., 1944, 58: 89-94, 214-23, 278-81; 59: 19-25.
It is suggested that vegetable growing could be made a profitable commercial venture in North Queensland, by adapting cultural methods to the prevailing climatic conditions. Without irrigation the season would be restricted to the end of the wet season period and the first drier winter months, the season for frost susceptible crops in the inland areas being even shorter. Irrigation, however, would allow of extending the growing period by many months and of building up a stable vegetable industry. The general instructions given in some detail refer to selection of site, soil management, fertilizers, sowing, seed bed treatment, seed treatment, rational cropping, irrigation, cultivation, pest and disease control and harvesting and marketing, specific directions being added for the following vegetables: cabbage, cauliflower, green sprouting broccoli, brussels sprouts, choyst, kohlrabi, turnip, swede, radish, okra, French beans, long beans, sword beans and peas.
* Part I. Briant, A. K., and Tidbury, G. E., *ibidem*, 1942, 8: 80-4, H.A., 13: 619.
† Or Chinese cabbage.

1932. BEIRNAERT, A. 633.912-1.52
(4) Over enkele eigenschappen van eenige meest bekende hevea-cloonen. (Some characters of well-known *Hevea* clones.)
Bull. agric. Congo belge, 1942, 33: 226-44.
- KNIGHT, P. 633.913-2.7
Insects associated with the Palay rubber vine [*Cryptostegia grandiflora*] in Haiti.
J. econ. Ent., 1944, 37: 100-2.
- PARISINOS, C. C., SHEPHARD, C. Y., AND JOLLY, A. L. 63(729.87)
Peasant agriculture. An economic survey of the Las Lomas District, Trinidad.
Trop. Agriculture, Trin., 1944, 21: 84-98.
- RYAN, C. E. V. 633.72-1.521
Some notes on the selection of high-yielders on Doombagastalawa Estate, Kotmale.
Tea Quart., 1943, 16: 45-51.

STORAGE.

1933. GREGORY, J. H. 634.1/3-1.564
Packing houses and their equipment.
Qd agric. J., 1944, 58: 151-77.
A detailed description by the Queensland Instructor in Fruit Packing of packing shed equipment and shed layout for handling such fruits as apples, pears, citrus and stone fruits as well as passion fruits and bananas. The instructions are supported by a large number of diagrams and some photos.
1934. FILINGER, G. A., AND MACKINTOSH, D. L. 664.8.037
Preserving foods in frozen food lockers.
Circ. Kans. agric. Exp. Stat. 217, 1943, pp. 38, being *Contr. Dep. Hort. 197* and *Contr. Dep. Animal Husbandry 154*.
About 20 pages of this well illustrated bulletin are devoted to the preservation of different kinds of vegetables, fruits and juices, the information presented being based on trade practices and the research work of the Kansas and other state agricultural experiment stations. Following general remarks on the treatment of fruits and vegetables detailed instructions are given on suitable varieties, preparation, packing, freezing and storing of each item.
1935. MARSHALL, R. E. 664.84/85
Vapor barriers in relation to moisture accumulation in walls of farm storages.
Quart. Bull. Mich. agric. Exp. Stat., 1943, 25: 376-81, bibl. 1.
The principles of moisture movements into and through walls are discussed and recommendations are made for the placing of vapour barriers in farm storages of the type prevailing in Michigan, which consists of two 4-in. tile walls with fill-type insulation between the wall units. The suggestions refer to 4 classes of storage: (1) The sharp freezer or locker plant, (2) the 32° F. storage operated throughout the year, (3) the 32° F. storage operated from late August through March or April, (4) the air-cooled storage operated from late September through March. It is not thought necessary to apply an additional vapour barrier to well-laid face tile of types (3) and (4), which are mainly used for horticultural crops.
1936. MARSHALL, R. E. 664.85.11
A twenty-year development of storage facilities for apples in Michigan with special reference to grower-owned storages.
Quart. Bull. Mich. agric. Exp. Stat., 1943, 25: 360-5.
The collected data show that in 1942 apple storage facilities in Michigan had a capacity of 3,500,000 bushels. It is estimated that this figure represents 60-70% of the normal commercial crop of autumn and winter apple varieties packed at harvest time plus those that are held ungraded in farm storages. It is suggested that still more storage space is required and that it would be desirable to provide certain devices for using ice until the installation of mechanical refrigeration is possible. A table indicates the distribution of the available storage space among 310 owners and in different areas of the state.
1937. TROUT, S. A., AND OTHERS. 664.85.11.035.1
Studies in the metabolism of apples. I. Preliminary investigations on internal gas composition and its relation to changes in stored Granny Smith apples.
Reprinted from *Aust. J. exp. Biol.*, 1942, 20: 219-31, bibl. 23.
The technique used for determining respiration rate and composition of the internal atmosphere of apples is described and discussed in full. A method is suggested for the quantitative expression of the resistance of the fruit to the passage of carbon dioxide and oxygen. The application of skin coatings greatly reduced internal oxygen concentration, but this was not necessarily accompanied by an increase in carbon dioxide. The reduced respiration rate was probably due to the fall in internal oxygen concentration. An eventual decrease in respiration rate also occurred in untreated apples held at 21·1° C. after various periods of storage at 1·1° C. The decrease in internal oxygen which was often, but not always, associated with decrease in respiration rate is attributed to increase with age in the resistance of the fruit to gaseous diffusion. Increased temperatures from 7° C. to 47° C. were accompanied by increased internal concentrations of carbon dioxide and decreased oxygen. When apples were transferred from 15° C. to 7° C. the changes were reversed, the original values being regained at 15° C. Changes in the composition of the external atmosphere were reflected by changes in the internal atmosphere. Colour development was found to be correlated with oxygen concentration, being completely inhibited when the internal concentration was reduced by treatment with skin coatings to values below 3% or the external concentration to values below 8%. Fruit may colour without ripening or ripen without colouring.
1938. LOTT, R. V. 634.11-1.547.6: 664.85.11
Some spectral curves of maturing apples.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 59-62, bibl. 3.
A spectral analysis of color changes in flesh and skin of maturing Grimes Golden and Stayman Winesap apples.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 157-71, bibl. 9.
Notes of an investigation into the possibility of determining the maturity of fruit by spectrophotometric methods.
1939. FISH, V. B. 664.85.11: 577.16
The effects of storage upon the ascorbic acid content of some West Virginia apples.
Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 73-8, bibl. 11.
Ascorbic acid contents, determined as the apples were received at the West Virginia Experiment Station in September and October 1942, range between 1·7 and 4·5 mg. per 100 g. of tissue including the peel. During the first two months of storage the average loss of ascorbic acid amounted to 25·7% and in 4 months to 27·5% of the total ascorbic acid present when received. The samples, including the peel, at the end of this period contained about 1·3 times as much ascorbic acid as samples without peel. The ascorbic

acid is lost more rapidly from the skin than from the flesh during storage and is also lost rapidly from ground tissue on exposure to air. Thus it is obvious that exposure must be kept to a minimum during analysis.

1940. VAN DOREN, A. 664.85.11.038

A report on the construction and operation of a grower-size apple waxing machine.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 183-9, bibl. 3.

An illustrated description of the construction and use of a waxing and drying machine with a capacity for 300 to 600 bushels of apples a day according to drying conditions of the air.

1941. SMOCK, R. M. 664.85.11.035.1

The elimination from the atmosphere of ethylene evolved by apples.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 134-40, bibl. 7.

Brominated activated carbon was found in trials at Cornell to be the most successful agent for removing ethylene naturally evolved by stored apples. Oiled paper was not so good and wraps impregnated with ammoniated copper fluoride were useless for the purpose. The value of ozone seems doubtful.

1942. MCCOLLOCH, L. P. 634.11-2.4: 664.85.11

Sporonema rot of apples.

Phytopathology, 1944, 34: 437-8, bibl. 1.

Sporonema oxycocci, a fungus causing decay in stored cranberries is for the first time reported as having attacked an apple stored at 36° F. Subsequent investigations at the Bureau of Plant Industry Station, Beltsville, Maryland, showed that the disease could be produced artificially in apples.

1943. HANSEN, E. 664.85.13.035.1

Relation of ethylene production to respiration and ripening of premature pears.

Proc. Amer. Soc. hort. Sci. for 1943, 1943, 43: 69-72, bibl. 4.

At Oregon Experiment Station climacteric and ripening of immature pears depended on the presence of certain minimum amounts of ethylene gas in the storage atmosphere. During the preclimacteric period there is a very great increase in the rate at which ethylene is formed in the fruit tissues. Thus the ethylene formed by pears during the course of metabolism is a vital factor definitely influencing the respiration and ripening of the fruit.

1944. PENTZER, W. T., AND ALLEN, F. W. 664.85.22.037

Ripening and breakdown of plums as influenced by storage temperature.

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 148-56, bibl. 7.

Tests in California with Beauty, Santa Rosa, Tragedy, Kelsey, Wickson, Duarte and President plums show that a temperature of 32° F. is necessary to stop practically all ripening in plums during a 12-day period. 40° F. allowed only a little ripening while appreciable colouring and softening resulted from exposure to 45° or 50° F. It was noticed that exposure to 80° F. caused the fruits of some of these varieties to remain tough, acid and light in colour. 55° F. appeared in some of the tests to be preferable to 65° F. as a ripening temperature.

1945. WILLISON, R. S. 664.85.25: 634.25

Problems relating to the maturity, transportation and storage of peaches.

Publ. Dom. Lab. Plant Path. St. Catharines, Ont., undated, pp. 4.

The article covers work on peaches done in the seasons 1933-41 at the Dominion Laboratory of Plant Pathology, St. Catharines, Ont., dealing with maturity tests and certain factors affecting fruit quality. The pressure test was found to give the most reliable indication of the degree of maturity. Although it gave more accurate results before maturity or

at the ripe stage than during the intermediate stages of ripening, its application at the last mentioned stage was more satisfactory than all other methods employed. In 8 years' tests carried out with a $\frac{3}{16}$ -in. plunger, Rochester and Elberta peaches became mature by the time the pressure had decreased to 19-20 lb., while the firmness of fully ripe fruits registered 3 lb. or less. Colour tests also proved useful, provided a new colour standard was set up every year. Peaches with a registered firmness of 16-18 lb. were best adapted to transportation without refrigeration within a 500-mile radius. For refrigerated transport to West Canada or Great Britain a firmness of 10-16 lb. was the stage which gave the highest quality fruit at the market of destination. Different varieties were found to vary in their response to cold temperatures, Rochester being least affected and Elberta standing cold very poorly. Of the white-fleshed varieties Peregrine did not suffer any damage either at 33° F. or 45° F. Figures are also given for the storage life of several varieties at different temperatures and recommendations on the control of brown rot are summarized. The weather before harvest was noted as having an influence on fruit quality.

1946. VELDHUIS, M. K., AND NEUBERT, A. M. 664.85.25.036.5: 664.85.25.037

The effect of storage on the canning quality of Elberta.

Fruit Prod. J., 1944, 23: 276-81, bibl. 7, being Contr. Agric. chem. Res. Div. 129 and Sci. Pap. Wash. St. Coll. 593.

The handling of large amounts of ripe Elberta peaches during a short peak period presents a serious problem to the canning industry, which is compelled to store a proportion of the fruits before they can be processed. No scientific data on the subject being available, the present investigation was conducted with a view to determining the best storage conditions for ripe Elberta peaches and the period for which they may be safely stored. The tabulated results show that (1) a storage temperature of as near as possible to 31° F. without danger of freezing was most favourable, (2) the maturity of the fruit should be within 5 days of full canning ripeness, and (3) the storage period should not exceed 4 weeks. The effect of storage temperatures of 37° and 45° F. on the canning quality was also studied.

1947. HALL, E. G., AND TROUT, S. A. 664.85.31.038 + 664.84.038

Some effects of waxing on weight loss from oranges and certain vegetables.

J. Aust. Inst. agric. Sci., 1944, 10: 80-2, bibl. 2.

Dipping oranges, cucumbers, turnips and carrots in a 10% wax emulsion and allowing them to dry by free exposure to the air reduced loss of weight during storage by 70%, 64%, 50% and 40% respectively. Since the effectiveness of the treatment was found to depend largely on the condition of the material, coating should be carried out as soon as possible after harvesting. It is suggested that the use of a 2.5% concentration of wax, reducing the loss by 70%, would be commercially satisfactory for oranges, whereas carrots and turnips would require 7.5-10% wax. When carrots were washed a 5% higher concentration was necessary to offset the increased loss resulting from washing. An additional advantage of the coating of cucumber was the considerable retardation of yellowing. The treatment proved ineffective with potatoes.

1948. REUTHER, W., AND CRAWFORD, C. L. 634.62-2.19

The effect of certain wax emulsions on the incidence of shrivel and on the respiration and development of date fruits.*

Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 172-82, bibl. 14.

The reduction in incidence of shrivel brought about by the

* This abstract is misplaced: it should be in the Citrus and Sub-Tropical Section.—Ed.

treatment of growing date fruits with wax emulsion sprays in concentrations greater than 1% of solids was more than offset by the abnormally dark colour of the fruit, poor flavour and decreased yield. The problems of shrivel are discussed.

1949. PRATT, H. K., AND BIALE, J. B. 664.85.653
Relation of the production of an active emanation to respiration in the avocado fruit.
Plant Physiol., 1944, 19: 519-28, bibl. 22.

Avocados at the College of Agriculture, California, showed a very pronounced climacteric rise at 25° and 15° C. but not at 5° C. Associated with it was the production of an active emanation, presumably ethylene, as indicated by the triple response of etiolated pea seedlings. Though no climacteric rise was apparent at 5° C., a cycle of emanation production was observed, after which the fruit showed a post-climacteric CO₂ response when transferred to a higher temperature. Pre-climacteric treatment with ethylene caused earlier and more uniform softening and improved quality compared to untreated controls.

1950. DENNY, F. E., THORNTON, C., AND SCHROEDER, E. M. 664.84.037: 581.192
The effect of carbon dioxide upon the changes in the sugar content of certain vegetables in cold storage.
Contr. Boyce Thompson Inst., 1944, 13: 295-311, bibl. 9.

Having previously shown that the changes in the sugar content of potatoes occurring in cold storage are modified in the presence of CO₂ (*ibidem*, 1941, 12: 79-84; 1942, 12: 361-74; 1943, 13: 73-8; *H.A.*, 12: 285, 1533; 13: 1568) the authors made carrots, parsnips, the seeds of green pods of lima beans and the tubers of Jerusalem artichokes the subject of the present investigation. The vegetables were stored at 5° C. for periods of 16-40 days at CO₂ concentrations of 0, 2.5, 7.5 and 22.5%. The results indicated that with carrots and Jerusalem artichokes CO₂ retarded or inhibited the increase of reducing sugar, but caused an increase with parsnips. No reducing sugar was found to occur in lima bean seeds. The presence of CO₂ was further noted to accelerate and retard the increase of sucrose with parsnip and Jerusalem artichoke respectively and to retard the decrease of this constituent with carrot and lima bean. Also hydrolysis of inulin in the Jerusalem artichoke was retarded by CO₂. Whilst the lower concentrations of CO₂ sufficed to produce these effects in the majority of cases a concentration of 22.5% CO₂ was required to retard both the increase in reducing sugar and the hydrolysis of inulin in Jerusalem artichoke.

FOOD VALUES AND PROCESSING.

1956. PUNJAB FRUIT JOURNAL. 664.84+664.85
Special preservation number.

Punjab Fruit J., 1944, Vol. 8, No. 29, pp. 42.
Articles are included by different authors on the following, among other, subjects: Preparation of squash (1) from passion fruit, (2) from mango; preparation of lemon barley water; canning of fruit and vegetables; citrus by-products; wine and cider making; vinegar making; candying of ber (*Zizyphus jujuba*) and of ginger; preparation of pickles; curing dates; dehydration of vegetables; preparation of carbonated citrus beverages. Much information is packed into small compass. This issue usefully supplements the previous special preservation number issued in 1942 (see *H.A.*, 13: 1591).

1957. MARSTON, H. R., AND DAWBARN, M. C. 613.2+581.192
Food composition tables.
Bull. Coun. sci. ind. Res. Aust. 178, 1944, pp. 104, bibl. 475.

1951. ANON. 633.682-1.563
La conservation du manioc par le procédé de Reine. (The storage of manihot according to de Reine's method.)
Rev. agric. Maurice, 1944, 23: 105-6.

Following the suggestion of a correspondent the Department of Agriculture in Mauritius tested M. de Reine's 200-year-old recipe for the storage of manihot roots and confirmed his results. It was shown in two experiments that the roots would keep in an excellent condition for 8-9 months if buried in a trench and covered with straw and soil.

1952. CLARIDGE, J. H. 635.25+664.84.25
Keeping quality in onions.
N.Z. J. Agric., 1944, 68: 275.

Keeping quality trials have been made in New Zealand by the Department of Agriculture with the onion varieties Pukekohe Longkeeper, Straw Spanish and certain other varieties not specified. Loss due to sprouting is much influenced by variety of onion and little by season or soil conditions. Loss due to rotting in storage is little affected by strain but is largely a result of growing conditions, though what factors are responsible is at present uncertain. Soil and climate are obviously important. Pukekohe Longkeeper is recommended as being of a strain that does not sprout freely.

1953. EICHMANN, R. D. 635.656: 632.76
Commercial pea warehouse tests of fumigants used against the pea weevil in the Palouse region.
J. econ. Ent., 1943, 36: 843-9, being *Sci. Pap. Wash. St. Coll.* 570.

The present investigation sets out to test a number of fumigants against the pea weevil under commercial warehouse conditions. Satisfactory results were obtained with discol cyanide, liquid cyanide, methyl bromide and chloropicrin. Details are given for optimum doses and mode of application.

1954. BARNES, H. F. 631.531.16: 632.77
Gall midge larvae among stored seeds.
J. roy. hort. Soc., 1944, 69: 242-3.

The small orange or red larvae ($\frac{1}{16}$ to $\frac{1}{10}$ in. long) found sometimes in great numbers in stored seed are those of the gall midges *Clinodiplosis* sp. and *Lestodiplosis* sp. respectively. The latter is predaceous. Neither of them is harmful to the seed. The exact nature of the food of *Clinodiplosis* is unknown.

1955. ALLEN, F. W., PENTZER, W. T., AND BRATLEY, C. O. 664.85.22.037
Carbon dioxide investigation: dry ice as a supplement to refrigeration of plums in transit.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 141-7, bibl. 7.

The data referring to fruits and vegetables take a prominent place in this bulletin, which presents the latest information on the composition of a wide range of foodstuffs as well as 475 titles of relevant, recent literature. The effects of storage, cooking and various dehydration processes are also discussed and illustrated in tables.

1958. KELLY, W. C., AND SMITH, O. 531.75: 581.192
Specific gravity determination as an aid to research.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 329-33, bibl. 14.

It is noted that a relation has been found to exist between specific gravity, quality and dry weight e.g. in carrots, sweet potatoes, dried prunes, etc. The determination of specific weight in other crops is also valuable. Specific gravity in potatoes has already proved a useful research tool in the study of cooking quality.

1959. SCHUPHAN, W. 635.1/7: 577.16
Über den Einfluss von Standort und Düngung auf den Provitamin-A-Gehalt der Gemüse. (The influence of locality and fertilizer on the provitamin A content of vegetables.) *Biochem. Z.*, 1940, 305 [sic], Heft 4, pp. 223-31, from abstract *Forschungsdienst*, 1942, Vol. 14, abstr. p. 48.
The author found that the effect of the locality may change the provitamin A content of vegetables by 17% and that fertilizer treatment may also produce marked changes. The genetically determined varietal difference in provitamin A content of carrots was shown to amount to up to 100%.
1960. JACOBY, F. C., AND WOKES, F. 577.16: 635.937.34
Carotene and lycopene in rose hips and other fruits. *Biochem. J.*, 1944, Vol. 38, *Proc. biochem. Soc.*, pp. I-II, bibl. 5.
In this communication to the 232nd meeting of the Biochemical Society held in London in January 1944, a method of carotene and lycopene estimation in rose hips, tomatoes and *Solanum dulcamara* berries is described. The carotene and lycopene contents of rose hips calculated from extinction coefficients were determined as 40-240 and 90-650 mg./g. respectively. One of the highest carotene contents was found in a hybrid of *Rosa dumetorum* and *R. mollis*.
1961. WEST, C., AND ZILVA, S. S. 664.85.11: 577.16
Synthesis of vitamin C in stored apples. *Biochem. J.*, 1944, 38: 105-8, bibl. 1.
The data obtained in an experiment conducted at the Lister Institute, London, confirmed previous observations that vitamin C is synthesized in young Bramley's Seedling apples during storage at 3° C. The capacity for this synthesis was found to diminish as the ratio of dehydroascorbic acid to ascorbic acid decreased in the maturity process. Since the vitamin C content of a ripe apple, matured on the tree, is much higher than that of a stored apple, which utilizes a chemically related precursor in its synthesis of vitamin C, it is suggested, that the extra vitamin present in the ripe fruit is supplied by other parts of the plant in a preformed state. The fruit samples were taken from two Bramley's Seedling trees growing at the East Malling Research Station. The statistical department of this station analysed the results.
1962. GOLBERG, L., AND LEVY, L. F. 634.421: 577.16
The antiscorbutic value of guavas.*
Reprinted from *J. S. Afr. chem. Inst.*, March, 1942, pp. 15, bibl. 22.
The ascorbic acid content of whole guavas, as also of the different parts of the fruit, was determined by titration with 2: 6-dichlorophenolindophenol. This titration is found to be specific for ascorbic acid in guavas. Causes of variation in ascorbic acid content were examined and are discussed. Canned guavas keep the high ascorbic acid content of the fresh fruit. The fruit should preferably be canned firm and unpeeled. Dehydration at low temperatures, 128-136° F., is the most successful method of preserving the ascorbic acid. Improvement in selection of fruit and technique have resulted in powders containing up to 4,500 mg./100 g. ascorbic acid. The syrup of canned guavas was subjected to biological assay and its high ascorbic acid content confirmed.
1963. ZSCHEILE, F. P., BEADLE, B. W., AND KRAYBILL, H. R. 577.16: 635.1/7+664.84.037
Carotene content of fresh and frozen green vegetables. *Fd Res.*, 1943, 8: 299-313, bibl. 13.
A study was made on the carotene content of spinach, asparagus, broccoli, beet leaves, peas, green beans and lima
* See also *Nature*, 1941, 148: 286, *H.A.*, 11: 1495.
- beans. Vegetables were analysed at different stages of development and after varied periods (up to 2 years) of low temperature cold storage after quick freezing. It was found that blanching is good as it retards loss of carotene. During storage both total carotene and β carotene decrease. Fresh raw spinach can be kept frozen for 34 days without large losses of carotene.
1964. VAJIC, B. 633.842: 577.16
Der Vitamin-C-Gehalt der Paprikafrüchte und ihre Bedeutung als Schutzernährungsmittel für die Volksernährung. (The vitamin C content of capsicum fruits and their significance as a protective food.) *Z. Vitaminforsch.*, 1941, 11: 42-56, from abstract *Forschungsdienst*, 1942, Vol. 14, abstr. p. 48.
The maximum vitamin C content of capsicum fruits, 490 mg./100 g., is usually reached in September; vitamin content is poor in May-June. Strains used as spice are richer in vitamin than those used as vegetables. No relation exists between fruit size and vitamin content.
1965. HEINZE, P. H., AND OTHERS. 635.65: 581.192
Ascorbic acid content of 39 varieties of snap beans. *Fd Res.*, 1944, 9: 19-26, bibl. 6.
The ascorbic acid contents were determined by the Morell method (*Industr. Engng Chem., Anal. Ed.*, 13: 793-4). Figures of autumn and spring analyses show that varieties tend to remain in the same relative position to one another with regard to vitamin C content in spring and autumn. The mean range in pods (average of spring and autumn figures) went from 19.8 mg./100 g. ascorbic acid, Stringless Refugee Bush Snap Bean, to 34.7 mg./100 g., Mammoth Horticultural Pole Snap Bean, and in leaves from 93.2 mg./100 g., Stringless Blue Lake 4157 Pole Snap Bean, to 155 mg./100 g., Tennessee Green Pod Bush Snap Bean.
1966. HOLLINGER, M. E. 633.492: 581.192
Ascorbic acid value of the sweet potato as affected by variety, storage and cooking. *Fd Res.*, 1944, 9: 76-82, bibl. 8.
In tests made in Louisiana ascorbic acid values during the first month after harvesting ranged from 0.235 mg. per gram for Triumph to 0.333 mg. per gram Nancy Hall variety. Losses of from 25% to 40% occurred after long storage at 60° to 80° F. From 69% to 83% remained in the potatoes after cooking by normal methods.
1967. DEEDS, F. 635.13: 577.16
Protein-ascorbic acid complex in carrots. *Fd Res.*, 1943, 8: 275-9, bibl. 10.
Results obtained with carrots agree with the claims of other workers that certain vegetables contain protein-combined ascorbic acid.
1968. BACHARACH, A. L., AND COATES, M. E. 577.16: 634.1/8
The vitamin P activity of some fruits and fruit products. *Biochem. J.*, 1944, Vol. 38, *Proc. biochem. Soc.*, p. V.
It has been possible to apply the guineapig capillary resistance method to the biological estimation of vitamin P in certain citrus fruits, in rose hips, in black currants, and also in concentrates and juices made on a commercial scale for each type of fruit. Citrus fruits are the richest source of vitamin P so far investigated, but distribution between peel and juice differs from that of vitamin C; no significant difference was found for vitamin P activity. There are indications that little vitamin P activity is lost in the processing of commercial concentrates, but that there is some diminution in activity during storage for several months, even in the refrigerator. [Authors' communication to the 232nd meeting of the Biochemical Society held in London, in January 1944.]

1969. POLLARD, A. 634.723: 577.16
The vitamin P activity of black currants.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 141-7, bibl. 11.
The isolation has been described of a fraction from black currant juice which shows vitamin P activity to a high degree. Some of the properties of the material and methods of purification are discussed and an account is given of the absorption spectra of this material and of some other related substances. A crystalline substance has been isolated from black currants which appears to be a flavonol and does not show vitamin P activity. A summary is given of some of the recent findings of other workers on this subject, and the nature of the active substances and the methods of estimation are considered. [Author's summary.]
1970. BROWN, H. D., SHORT, R. M., AND ALBAN, E. K. 664.84 + 664.85
Sulfur dioxide vs. blanching as an agency for inactivating peroxidase and catalase for dehydration and freezing.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 193-5, bibl. 1.
One year's work in Ohio gave promising results with some of the test material.
1971. GRIFFITH, R. B., AND JEFFREY, R. N. 581.192
Determining chlorophyll, carotene, and xanthophyll in plants.
Industr. Engng Chem. (Analytical Edition), 1944, 16: 438-40, bibl. 16.
A method for the determination of chlorophylls a and b, carotene, and total xanthophyll from a single ether solution is described. This method is adaptable to any spectrophotometer of good resolving power, provided preparations are available for determination of absorption constants for the instrument to be used. [From authors' summary.]
1972. CROOK, E. M., AND MORGAN, E. J. 577.16
The reduction of dehydroascorbic acid in plant extracts.
Biochem. J., 1944, 38: 10-5, bibl. 16.
1. Thirty species of plants have been examined [at the Biochemical Laboratory, Cambridge] for the presence of the enzyme catalyzing the reduction of dehydroascorbic acid by reduced glutathione. 2. In eight of these species the enzyme was absent. Addition of the juice from nine species at least doubled the rate of reduction of dehydroascorbic acid caused by GSH alone without added enzyme. 3. The most active species were cauliflower and broad bean, in both of which glutathione will protect ascorbic acid from oxidation by atmospheric O₂. 4. The physiological role of the enzyme is discussed. [Authors' summary.]
1973. SCHWIMMER, S. 664.84
Regeneration of heat-inactivated peroxidase.
J. biol. Chem., 1944, 154: 487-95, bibl. 22, being *Contr. Enzyme Res. Lab.* 93.
A comparison of the activity of peroxidase in juices of several types of vegetables by two well-known methods.
1974. SIMPSON, J. I. 613.2: 634 + 635
Home practices and the nutritive value of fruits and vegetables.
Fd Res., 1943, 8: 353-63, bibl. 53.
A review of the available evidence shows that not many generalizations on the effect of home practices on the nutritive value of fruits and vegetables can yet be made with certainty.
1975. BALOG, E., AND CRUESS, W. V. 664.84.047 + 664.85.047
Observations on dehydrators.
Fruit Prod. J., 1944, 23: 329-31, 346.
Samples of prunes, carrots, potatoes and cabbage were taken from 4 counter current tunnel dehydrators and 2 two-stage dehydrators at different localities to study the rates of drying at various stages in the tunnel. The results indicate that the final stages of drying are slow and suggest that the finishing of the partially dry product in a second tunnel in air of lower temperature and velocity would be advantageous. The investigation was carried out at the Fruit Products Laboratory, University of California.
1976. HENDRICKSON, A. H., AND VEIHMAYER, F. J. 664.85.22.047
Some factors affecting the quality of dried prunes.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 205-10, bibl. 4.
In studies at Davis, Calif., specific gravity of dried French prunes was found to be affected by high temperatures, temperatures of over 105° F. being very injurious. Specific gravities did not vary with size of prune, were not materially affected by irrigation, were not correlated with yield and not affected by thinning. They were not consistently correlated with the total sugars fraction.
1977. FENTON, F., AND GIEFT, H. 664.84.047: 613.2
Palatability studies of commercially dehydrated vegetables.
Fd Res., 1943, 8: 364-76, bibl. 6.
A study of (1) the effects of methods of storage on palatability of beets, cabbage and rutabagas, and (2) the effects of several methods of refreshing and cooking on palatability and water absorption of these vegetables and of potatoes and swedes.
1978. CYTRON, B. J., BALOG, E., AND CRUESS, W. V. 664.84.13.047
Effect of syrup treatment on compressing of dehydrated carrots and cabbage.
Fruit Prod. J., 1944, 23: 338-9, bibl. 1.
The compressibility of dehydrated carrots at relatively low temperatures (100-120° F.) and adhesion of the compressed products were greatly improved by dipping blanched carrots in 50° Brix dextrose solution and blanched cabbage in 30° Brix dextrose solution before dehydration. The dried products were not too sweet in flavor. Yield was increased. Keeping quality is under study and will be reported later. [Authors' summary.]
1979. MANN, L. K., AND WEIER, E. 664.84.13.047
Some factors affecting the variability of dehydrated carrots.
Fruit Prod. J., 1944, 23: 309-11, 317, bibl. 5.
In order to understand the changes taking place in carrot tissue during processing a study was begun at the University of California of some factors affecting the uniformity of the raw product and of some of the variations arising from dehydration practice. The constituents starch and carotene were chosen as the object of the initial investigation. The starch content of raw carrots was found to vary largely, 2% of the dry weight of the flesh being determined as the average content. The figures of previous workers are quoted for carotene, but it is pointed out by the authors that the carotene content cannot be estimated from the colour of the carrot, as the latter may be considerably modified by the presence of intercellular air. Great variability was also found to occur in the starch content and in the proportion of the starch and dextrin content of the dried product. Variations in blanching and dehydration methods were shown to be associated with variations in the stage of carotene in the dry product. Finally, suggestions are made to breeders as to the factors requiring their consideration in producing carrots for dehydration.
1980. ALDERMAN, D. C., AND NEWCOMBE, B. 664.84.65.037
Some factors influencing quality of dehydrated, canned and frozen green beans.
Fruit Prod. J., 1944, 23: 365-8, bibl. 5.
In statistically planned, comparative trials on the quality of dehydrated, canned and frozen green beans of the stringless

greenpod variety, cut in three different ways, dehydrated, shredded beans were rated as equal to frozen beans and much superior to the canned product. In all three cases quality deteriorated after 6 months' storage.

1981. BROWN, H. D., AND MURNANE, C. 664.85.036.5 + 664.84.036.5
The explosion *vs.* usual method of peeling vegetables and fruit.
Proc. Amer. Soc. hort. Sci. for 1944, 1944, 44: 190-2.

By subjecting lima beans, peppers, potatoes, sweet potatoes, peaches and apples as quickly as possible to a temperature of from 240° to 250° F. and a pressure of 10 to 15 lb. and then creating a vacuum of from 25 to 27 inches by shutting off the steam and rapidly forcing cold water into the retort used it was possible to remove the skin quickly and with comparatively little waste, ready for canning. A patent has been applied for.

1982. NEUBERT, A. M., AND VELDHIJS, M. K. 634.25: 664.85.25.036.5
Ripening Washington-grown Elberta peaches for canning.
Fruit Prod. J., 1944, 23: 357-60, 379, 381, bibl. 6, being Sci. Pap. Wash. St. Coll. 611.

All factors considered 75° F. was found to be the most satisfactory temperature for ripening Elberta peaches after harvesting for canning. No special regulation of relative humidity was required under ordinary commercial storage conditions. The accumulation of gaseous emanations from the fruit seemed to be favourable to colour development. Thus peaches ripened in cabinets at 75° F. were of better colour than those stored in open boxes at room temperatures (70°-80° F.), although flavours were equal. Temperatures of 85° F. and higher were detrimental to flavour.

1983. SMITH, H. R., AND SMITH, K. R. 664.84.036.5
Effect of freezing on utilization of canned foods.
Fd Res., 1944, 9: 66-75.

Results with various animal products, fruits and vegetables show the necessity for gradual thawing of frozen canned foods. After thawing they should be prepared and used in the usual way.

1984. CRANG, A., AND OTHERS. 664.85
Notes on domestic fruit preservation.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 148-53.

Preliminary trials show that the following alternative methods of bottling fruit are worth further trial:—(1) Pouring boiling water over the fruit in the bottles three times, (2) sterilizing the bottles of fruit in boiling water, (3) sterilizing the bottles of fruit under steam pressure. The trial of various cellulose films for covering bottled fruit proved them to be unsatisfactory and calico treated with melted paraffin wax was better. The addition of SO₂ to starch paste used for paper covers gave encouraging results. Experience shows that if fruit preserved with Campden tablets is needed for use later in jam, much storage space can be saved by halving and stoning or pulping the fruit before preserving.

1985. CRANG, A., AND JAMES, D. P. 664.85.725.035.1
A note on the toughening of gooseberries preserved with sulphur dioxide.*
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 154-7.

When gooseberries are preserved in hard water by means of the Campden tablets a degree of toughening occurs and recent work indicates a relationship between degree of toughness and calcium content of the preserved fruit. The absorption, to a lesser degree, of calcium from hard water

by heat-sterilized gooseberries does not produce toughening. Immature gooseberries are less tough when preserved in hard water by the Campden method than mature or over-ripe berries.

1986. NEUBERT, A. M., AND VELDHIJS, M. K. 663.813: 634.11
Clouding and sedimentation in clarified apple juice.
Fruit Prod. J., 1944, 23: 324-8, 347, bibl. 21, being Sci. Pap. Wash. St. Coll. 588.

Although it has not been possible, so far, to recommend reliable measures for the control of clouding and sedimentation in clarified apple juice, the present study revealed the chemical nature of the sediment. It was found to be a rather inert substance which agreed in its chemical properties with those of phlobaphenes. It is thought that the formation of the sediment is due to a disturbance in the clarification process of the colloiddally dispersed state in which phlobaphene is believed to be present in all raw apple juice. It is suggested that efforts should be directed to restabilizing the colloidal system after clarification.

1987. MOTTERN, H. H., AND MORRIS, R. H. 663.813: 634.11
Bland apple sirup.

Fruit Prod. J., 1944, 23: 261-9, 283-5.
Since the publication of *Circ. U.S. Dep. Agric. ACE-180* (reprinted *Fruit Prod. J., 1942, 21: 356, H.A., 13: 315*) so much additional information on apple sirup production and its use has been obtained, that a new paper on the subject appeared desirable. The present article describes the manufacture of bland apple sirup in detail according to the latest data available and gives figures of production cost. It is believed that the tobacco industry, where it is used as a substitute for glycerin, will continue to provide an important market for it in peacetime.

1988. BEATTIE, H. G., WHEELER, K. A., AND PEDERSON, C. S. 663.813
Changes occurring in fruit juices during storage.
Fd Res., 1943, 8: 395-404, bibl. 12.

A discussion of the pronounced loss of ascorbic acid and of colour in fruit juice during storage and of the effect on these processes of adding ascorbic acid to the juice.

1989. MOORE, E. L., WIEDERHOLD, E., AND ATKINS, C. D. 663.813: 634.3
Changes occurring in orange and grapefruit juices during commercial processing and subsequent storage of the glass- and tin-packed products.
Fruit Prod. J., 1944, 23: 270-5, 285, bibl. 12.

The investigation described was a collaborative study between the Florida Citrus Commission and the U.S. Citrus Products Station, Winterhaven, Florida.

1990. ROSS, E. 663.813: 634.3: 577.16
Effect of time and temperature of storage on vitamin C retention in canned citrus juice.
Fd Res., 1944, 9: 27-33.

Vitamin C potency after processing ranged from 98% to 92% of the freshly reamed juice. Very good retention was obtained by storing at 17° C., i.e. about 85% after a year, while under refrigeration 90% of the vitamin C of the freshly reamed juice was retained after a year. As temperature rose above 17° the rate of loss increased.

1991. STEVENS, J. W., AND MANCHESTER, T. C. 634.3-1.57: 632.3
Methods for direct count of microorganisms in citrus products.
J. Ass. off. agric. Chem., Wash., 1944, 27: 302-7, bibl. 8.

A method for the bacteriological study of citrus products by direct microscopic examination is described. Tabulated data present the results of counts obtained with a number of different citrus juice products and 5 samples of commercial powdered pectin.

* See also *ibidem* for 1941, pp. 118-24, *H.A., 12: 1106.*

1992. KERTESZ, Z. I., AND LOCONTI, J. D. 663.813: 635.64
Factors determining the consistency of commercial canned tomato juice.
Tech. Bull. N.Y. St. agric. Exp. Stat. 272, 1944, pp. 36, bibl. 26.
A tentative definition of "desirable consistency" in tomato juice is proposed. Juice of desirable consistency should have a serum showing a relative viscosity of 1.4 to 2.0 when measured by the Ostwald viscosimeter at 30° C. At the same time, the gross viscosity of the juice, as measured by the Stormer viscosimeter at the same temperature, should be in the range of 1.5 to 2.2 relative viscosity. Tomato juices which show these characteristics exhibit a pleasing smoothness in their texture. Relatively few commercial canned tomato juices fall within these ranges. By only a slight increase in the pre-heating temperatures used during manufacture a viscous serum and a juice of superior consistency may be produced. [From authors' abstract.]
1993. BERGERET, G. 663.229
Características del vino vermouth elaborado en el Uruguay. (Characteristics of vermouths manufactured in Uruguay.)
Reprinted from *Rev. Fac. Agron., Montevideo*, 1943, No. 32, pp. 51, bibl. 16.
The analyses of nine vermouths made in Uruguay are presented, with a preliminary discussion on the nature of vermouth and notes on the legislation governing its manufacture. A list is given, with the Spanish and botanic names and mention of the part used, of no less than 58 plants employed in the manufacture of local vermouth, though fortunately perhaps all are not found in any one bottle. Some of these herbs are illustrated and their use and properties discussed. A final table gives 19 herb formulas for compounding palatable near-Italian and near-French vermouths, though in the case of the Italian the flavour of the real thing cannot be truly matched.
1994. ANON. 664.85.3.047
Candyng citrus peels.
J. Dep. Agric. Vict., 1944, 42: 232-3.
Detailed instructions are given.
1995. ATKINS, C. D., WIEDERHOLD, E., AND HEID, J. L. 634.337-1.56
The recovery of flavoring oil from Persian limes—preliminary experiments.
Fruit Prod. J., 1944, 23: 306-8, bibl. 4, being *Contr. Agric. chem. Res. Div. U.S. Dep. Agric.* 137.
Preliminary tests were made on the quantity of oil present in and obtainable from cull Persian limes, including a comparison of extraction equipment and treatments in recovering the cold-pressed lime oil. [From authors' summary.]
1996. CRUESS, W. V. 635.25/26: 631.56
Experiments on garlic and onion extracts.
Fruit Prod. J., 1944, 23: 305, 313.
Recipes evolved in small-scale trials at the University of California for preparing and preserving garlic and onion juices and sliced garlic. The products were satisfactory.
1997. FABIAN, F. W., AND WADSWORTH, C. K. 635.64: 631.56
The utilization of green tomatoes.
Fruit Prod. J., 1944, 23: 361-2, 368.
The making of processed dills, sweet tomato slices and relish from salted green tomatoes after refreshing, as well as the canning of green tomatoes direct from the plant, are described. Green tomato juice was found to be unpalatable. Salted, mature, green tomatoes must be kept below 70° F., the critical temperature above which the formation of lycopin, the red colouring material of the fruit, is hastened.
1998. WADSWORTH, C. K., AND FABIAN, F. W. 664.84.656.035.2
Salting Early June and Alaskan peas.
Fruit Prod. J., 1944, 23: 298-301, 316, bibl. 6.
A study was made of dry and brine methods of salting Alaskan and Early June peas. Experimental data of bacteriological analyses, of the rate of penetration of salt, of the rate at which salt is withdrawn and of the effect of preserving peas in salt upon their carotene and ascorbic content are presented in tables. The main results were briefly that (1) peas can be brined satisfactorily according to a method described in detail, (2) dry-salted peas do not produce sufficient brine, which has, therefore, to be supplemented, (3) salt penetrates and is given up quickly, (4) the toughness of peas increases with the salt concentration, (5) the ascorbic acid originally present is completely lost, whilst carotene losses vary from nil to one-third.
1999. MACDONOUGH, J. V., AND HAFENREFFER, T. C., Jr. 577.16: 663.25
Some experiments in preparing brewers' yeast for food.
Commun. Wallerstein Labs., 1944, 7: 39-46, bibl. 10.
A process is described by which brewers' yeast may be debittered and fortified with vitamins, thus providing a valuable foodstuff for human consumption.
2000. FONTAINE, T. D., SAMUELS, C., AND IRVING, G. W., Jr. 634.58: 633.85
Properties of peanut meal. Influence of processing factors.
Industr. Engng Chem. (Industrial Edition), 1944, 36: 625-7, bibl. 7.
The data presented indicate that, with proper temperature and moisture control during processing, satisfactory oil removal can be accomplished with a minimum of protein denaturation. [From authors' summary.]
2001. NAGHSKI, J., BEINHART, E. G., AND COUCH, J. F. 633.71-1.56: 581.192
Fire-cured tobaccos. Phenol, nicotine, and bacterial contents.
Industr. Engng Chem. (Industrial Edition), 1944, 36: 556-9, bibl. 12.
A method for determining volatile phenols in tobaccos is presented. The investigation was carried out at the Eastern Regional Research Laboratory, Philadelphia.
2002. HAASIS, F. W. 581.192: 633.913
Staining rubber in ground or milled plant tissues.
Industr. Engng Chem. (Analytical Edition), 1944, 16: 480-1, bibl. 10.
Following suitable pretreatment of samples, differential staining with Sudan IV and iodine green has proved a useful and relatively rapid aid in the microscopic study of rubber in ground guayule tissues, mounts in many cases being ready for examination within 90 minutes after starting the schedule.
2003. BARNES, B., TRESSLER, D. K., AND FENTON, F. (17) 577.16: 664.84.656
Thiamin content of fresh and frozen peas and corn before and after cooking.
Fd Res., 1943, 8: 420-7, bibl. 15.
BURROUGHS, L. F., AND OTHERS. 634.11-1.563.5
The treatment of apple pomace prior to drying for subsequent pectin extraction.
A.R. Long Ashton agric. hort. Res. Stat. for 1943, 1944, pp. 136-40, bibl. 1.
CHILD, R. 634.61-1.57
Coconut shells as an industrial raw material.
I. Composition of shells.
Curr. Sci., 1943, 12: 292-4, bibl. 16.
II. Miscellaneous uses: Fuel.
Ibidem, 1944, 13: 4-6, bibl. 14.
III. Estimated world production.
Ibidem, 1944, 13: 150-2, bibl. 10.

- LOZET, F. 633.74-1.56
Étude de quelques points particuliers concernant la fermentation du cacao. (Special points in connexion with the fermentation of cacao.) *Bull. agric. Congo belge*, 1944, 33: 255-77.
- MASURE, M. P., AND CAMPBELL, H. 664.84.037
Rapid estimation of peroxidase in vegetable extracts—an index of blanching adequacy for frozen vegetables. *Fruit Prod. J.*, 1944, 23: 369-74, 383, bibl. 19.
- NEUBERT, A. M. 663.813: 634.11
Effect of filtration on appearance, viscosity, and alcohol-insoluble fractions of apple juice. *Fd Res.*, 1943, 8: 477-88, bibl. 11.
- PEDERSON, C. S., AND BEATTIE, H. G. 663.813
Buffering effect of fruit juices. *Fd Res.*, 1943, 8: 405-8, bibl. 8.
- PHAFF, H. J., AND DOUGLAS, H. C. 663.25
A note on yeasts occurring in dessert wines. *Fruit Prod. J.*, 1944, 23: 332-3, bibl. 11.
- RIBÉREAU-GAYON, J. 663.25
Études sur les transformations du vin par les bactéries. (Studies on the transformation of wine by bacteria.) *Ann. Ferment.*, 1942, 7: 21-39, 74-92, 142-56, from abstract *Zbl. Bakt.*, Abt. II, 1944, 106: 225-6.
- ROE, J. H., AND OESTERLING, M. J. 577.16
The determination of dehydroascorbic acid and ascorbic acid in plant tissues by the 2,4-dinitrophenylhydrazine method. *J. biol. Chem.*, 1944, 152: 511-7, bibl. 5.
- SCHANDERL, H. 663.25
Über den bakteriellen Säureabbau im Wein. (The decomposition of acid in wine by bacteria.) *Dtsch. Weinztg.*, 1943, 80, Nr. 43/46, from abstract *Zbl. Bakt.*, Abt. II, 1944, 106: 224-5.

- SPIES, J. R., AND OTHERS. 633.88.32.491: 581.192
The chemistry of allergens. VIII. Isolation and properties of an active protein-polysaccharidic fraction, CB-1A, from castor beans. *J. Amer. chem. Soc.*, 1943, 65: 1720-5, bibl. 24.
- IX. Isolation and properties of an active, carbohydrate-free protein from castor beans. *Libidum*, 66: 748-53, bibl. 13.
- THOMPSON, A. H., AND MAHONEY, C. H. 635.653: 581.192
Some ascorbic acid and moisture determinations on fresh and dehydrated lima beans. *Proc. Amer. Soc. hort. Sci. for 1944*, 1944, 44: 448-52, bibl. 5.
- THURIAUX, L. 633.87
Matières tannantes d'origine végétale au Katanga. (Analyses of some plants of the Belgian Congo, native or introduced, supposed to be rich in tanning substances.) *Bull. agric. Congo belge*, 1942, 33: 245-54.
- WIDMER, A., PEYER, E., AND HUBER, H. 663.25
Das Braunwerden der Weine und Obstweine. Vorbeugungsmittel und Behandlung brauner Weine und Obstweine. (The browning of wines and fruit-wines. Precautionary measures and treatment of brown wines and fruit wines.) *Schweiz. Z. Obst- u. Weinb.*, 1944, 53: 252-6, being *Flugschr. Eidgen. Versuchsanst. Obst- u. Gartenb. Wädenswil* 11.
- WHITACRE, J., AND OTHERS. 635.127: 581.192
Eating quality and some aspects of composition of turnip greens at successive stages of growth. *Fd Res.*, 1944, 9: 42-55, bibl. 9.
- WHITACRE, J., AND OTHERS. 635.127: 581.192
Calcium, phosphorus and iron contents of turnip greens, as analyzed by method of sampling. *Fd Res.*, 1944, 9: 56-65, bibl. 6.

NOTES ON BOOKS AND REPORTS.

2004. SPARROW, K., Jr. 582.81: 635.967.4
Aquatic Phycomyces exclusive of the Saprolegniaceae and Pythium.^{*}
University of Michigan Press, Ann Arbor; Humphrey Milford, London, 1943, pp. xix+785, 69 figs., bibl. 704, \$5 or 28s.

Mycologists, particularly those interested in the lower fungi, will find this book indispensable, as bringing together in one volume information that is scattered in a great number of periodicals, many of them not readily accessible. It contains diagnoses of 7 orders, 21 families, 112 genera, 475 species, 10 varieties, with morphological and developmental discussions of each order, and keys for the identification of species. Plant pathologists will find little information on their own special subject, for although many of the species are parasitic they bear no relation to diseases of economic plants. From the "List of Substrata" it will be seen that most of the fungi described occur on the algae; flowering plants serving as hosts are mostly water-weeds. Some of the fungi are found in pollen grains, a few on apple and pear fruits, and some on other fungi. H.W.

2005. HOAGLAND, D. R. 581.13: 631.8
Lectures on the inorganic nutrition of plants.[†]
Chronica Botanica Co., Waltham, Mass., 1944, pp. (x)+226, 28 plates, 45 figs., \$4.00.

This book consists of a revision of the Prather lectures

delivered by the author at Harvard University, with two supplementary lectures. The modest preface almost disarms the critic, and it should be stated immediately that the book consists of a series of discursive essays and in no way forms a textbook on the subject. It does not attempt to deal with all aspects of the field, and even those aspects included are by no means covered exhaustively. The lectures are written around work done during the past 25 years at the University of California, and relatively little attention is paid to work elsewhere. Topics discussed in some detail include zinc as a plant nutrient; ionic accumulation and its relation to respiration; the rôle of organic acids in mineral nutrition; and the use of radioactive isotopes in nutritional studies. While the book cannot be recommended to students except as a supplement to a full course of lectures on the subject, it will be found stimulating reading by those already passably familiar with the problems of plant nutrition. The book is not well documented, work frequently being cited without a reference, but it has adequate subject and author indexes. It is handsomely produced; but it would perhaps not be amiss to point out that the abundant plates, while contributing to the rather high price, do not add greatly to the reader's understanding of the text. Photographs which form useful lantern illustrations to a lecture are often not worth printing in a scientific publication; this particularly applies to pictures of plants subjected to different treatments and differing in little other than size. A minor complaint is that references to plates in the text are relegated to the end of a paragraph instead of being inserted at the most appropriate place, and that references to text-figures and tables are omitted. D.W.G.

^{*} Forming Vol. XV of the Scientific Series, University of Michigan Studies.

[†] Plant Science Books Series, No. 14.

2006. BROWNE, C. A. 63: 54

A source book of agricultural chemistry.

Chron. bot., 1944, Vol. 8, No. 1, pp. 290, 35.

The author gives a most readable account of the contributions made to agricultural chemistry by some 55 philosophers or scientists through the ages. The period covered stretches from the life of the early Greek nature philosophers such as Thales of Miletus, ca. 640-546 B.C., to that of Liebig, 1803-73. The enthusiasm and energy of most of these workers were boundless and gradually light was thrown on problems, the very nature of which had in many cases not been clearly understood. Liebig in his lifetime changed his ideas frequently as phenomena were observed, and the process of revelation still goes on. To have the basis of modern thought on agricultural chemistry so pleasantly set out is most helpful and we are grateful to the author and to *Chronica Botanica* for this illuminating account.

2007. FAWCETT, G. S., AND STOUGHTON, R. H.

581.133.9: 545

The chemical testing of plant nutrient solutions.

The Tintometer Ltd., Salisbury, Wilts., 1944, pp.

86, 8s. 6d.

The practical possibilities of nutrient solution methods of growing plants without soil depend among other things on having simple rapid methods of analysis which the grower can use for periodically testing the composition of his nutrient solutions. The present book provides the grower with information on laboratory technique, apparatus required and methods of analysis which have been found useful for the purpose. Simplicity of technique and rapidity of analysis are requirements which impose limitations on the choice of methods and on the accuracy of the results. The authors are quite well aware of this and it is a pleasing feature of the book that difficulties and the merits and defects of each method are well presented.

Separation of nutrients prior to their estimation is not attempted. Colorimetric or turbidimetric methods of analysis are applied directly to the nutrient solution and compensation for interfering substances is made by calibration with standard solutions containing all the other ingredients of the nutrient solution and by adding reagents which have the effect of suppressing the interfering substance. Colorimetric tests are used for the estimation of pH, nitrate nitrogen, phosphate, magnesium, iron, manganese, and boron and turbidimetric tests are used for potassium and calcium. Rough methods for copper and zinc and a tentative colorimetric method for potassium are given in appendices at the end of the book.

In the colorimetric methods use is made of the All Purposes Lovibond Comparator and discs containing a range of glass colour standards. Technique is built round the use of this apparatus. Glass colour standards save time, labour and apparatus, but they do not make tests on standard solutions unnecessary as one might suppose from the book, for the latter are needed to check up on the effectiveness of the reagents used.

In the turbidimetric methods and the test for boron, comparison with liquid standards is made in black-sided micro test tubes and simple apparatus is described for this purpose. Line-charts, so widely used in rapid turbidimetric tests, are rejected as fundamentally unsound and the proposed method should be an improvement on them.

The reagents used in the tests have been known for many years but only comparatively recently has their use been extended from detection of the element to its quantitative estimation. A considerable amount of research has been necessary in developing quantitative methods and it would improve the quality of the book if more numerous references were included, preferably as footnotes to the reading page. Notes on the action of some of the reagents, which are added to deal with interfering substances, would also be helpful and would save a lot of searching of the literature on the part of those using the tests for the first time. The authors

may have considered it inadvisable or unnecessary to include such information in a book written primarily for the practical grower but the book will undoubtedly interest others with more technical knowledge and it is from these that suggestions for improving the methods will eventually come.

While it is not the function of the book to deal with interpretation of the tests it might be helpful to include in an appendix an example of the calculation of the quantity of nutrient salt to be added and the procedure to correct a deficiency in, say, 100 gallons of nutrient solution.

The book is well planned and the typography is excellent. The binding and paper are good for wartime conditions.

N.H.P.

2008. PIPER, C. S.

631.423 + 581.192

Soil and plant analysis. A laboratory manual of methods for the examination of soils and the determination of the inorganic constituents of plants.

Workers' Educational Association, University of Adelaide, 1942, pp. 368, 19 figs., references in each section, 18s. Aust.

Part I (250 pages) is devoted to methods for the examination of soils and Part II (112 pages) to methods for the determination of the inorganic constituents of plants.

Part I follows on an earlier publication *Methods for the examination of soils*, C.S.I.R. Pamphlet No. 8, by Professor J. A. Prescott and the author of the present book, and incorporates additions and improvements resulting from discussions with chemists working throughout Australia and New Zealand and in other parts of the world. It is stated in the preface: "With the exception of two or three of the less common determinations, all of the methods included . . . are in actual use in the laboratories".

In the introduction the writer states that in the choice of methods to be employed, "accuracy and reproducibility of the values obtained should be of the first importance and the results should be directly comparable with results obtained in other laboratories". The following two statements suggest that the writer looks on plant analysis as subsidiary to soil analysis: "In many fertility problems the information gained from a study of the soil can be considerably enhanced by the analysis of the plants growing on the soil." "The analysis of a range of plant species growing on a given soil type can prove a useful guide to the relative availability of the different mineral elements in that soil. Plant analysis has been found particularly valuable in regard to the availability of the trace elements such as manganese, copper, zinc and boron."

The Neubauer, Mitcherlich and *Aspergillus* methods are mentioned but are not described.

As its title suggests, the book is confined to soil and plant analysis, and interpretation of results is not considered. It is clearly written and is full of valuable practical details. It gives moreover most of the latest methods, including those for the trace elements: boron, cobalt, copper, iron, manganese, molybdenum and zinc.

W.A.R.

2009. MALISOFF, W. M. (Editor).

413: 581.1

Dictionary of biochemistry and related subjects.

Philosophical Library Inc., New York, 1943, pp.

579.

The preface claims: "The dictionary of biochemistry is a pioneering effort in an entirely new field. There have been no previous dictionaries of this kind."

It may be described as a dictionary containing numerous short articles on subjects of general interest, e.g. bacteriophage (3,000 words), enzymes (nearly 4,000 words), insulin (nearly 200 words), phosphate bond energy (1,000 words), photosynthesis (2,000 words), teeth (4,000 words).

It is concerned mainly with animal and human biochemistry. Plant biochemistry is dealt with very briefly, only those aspects of interest to animal biochemistry, especially pharmacology, being considered at any length. Thus some 60 words are devoted to the anthocyanins and nearly 4,000

to the cardio-active digitalis glycosides. On the other hand, whereas chlorophyll is given 150 words, haemoglobin is only mentioned as an example of the chromoproteins, except for about 20 words devoted to reduced haemoglobin.

W.A.R.

2010. SEIFFERT, G. (Translator, TAYLOR, M. L.) 632.8
Virus diseases in man, animal and plant.
Philosophical Library Inc., N. York, 1944,
pp. 332, \$5.

Much of this work is devoted to clinical descriptions of the numerous virus diseases infecting man and animals, but the general properties of viruses are also considered and one chapter (10 pages) deals with plant virus diseases. The date of the German copyright was 1938 and, so far as the plant virus section is concerned, the book is already largely out of date.

There are, too, a number of annoying misprints and the hand of the translator is very evident throughout. Thus we are astonished to learn that "a mosaic disease of the twig on the path is said to be transmissible by way of the eggs of an infected grasshopper" (p. 269) until it is realized that "Reis" means "twig" as well as "rice" and that the statement really refers to Fukushima's work on the transmission of the Rice Stunt virus through the eggs of infective leafhoppers. Other questionable translations abound, e.g. "Attention was already called to the use of goats as dispensers of weakened virus" (p. 178); "Plants may contain virus masked in a slumbering state" (p. 267).

Altogether the author's premonition in his preface has come only too true, "The present book will show certain but not avoidable lacks". We take leave, however, to question the non-avoidability of some of the "lacks".

I.W.P.

2011. STONEY, J. 634.1/7
Pruning and planting fruit trees.
Lindsay Drummond, London (revised edition),
1944, pp. 58, 2s.

This useful little book for the beginner who wishes to grow fruit in a garden covers a rather wider field than the title indicates, for besides dealing with pruning and planting, it describes the general cultivation of tree and small fruits, including chapters on manuring and spraying. The information is on the whole accurate and is presented in a readable form, but those who have passed the beginner stage are likely to require more detailed information than that afforded here.

H.B.S.M.

2012. BUSH, R. 634.7
Soft fruit growing.
Penguin Books Ltd., Harmondsworth, Middlesex
(Penguin Special S.119, 2nd edition), 1944,
pp. 175, 9d.

Although it is true that this revised edition of Raymond Bush's first Penguin on fruit growing corrects certain statements that appeared in the first edition, the main improvement lies in the inclusion of nineteen first-class photographic illustrations and apart from these pictures the booklet remains substantially unchanged. The fact that there still remain minor errors that have escaped the author's revising blue-pencil does not materially detract from the value of this excellent handbook but serves to emphasize the remark in the author's foreword that "to be useful a handbook should be revised every year".

H.B.S.M.

2013. MINISTRY OF AGRICULTURE, LONDON. 634.7
Fruit production: bush fruits.
Bull. Minst. Agric. Lond. 4 (5th edit.), 1942,
pp. 36, 1s.

This is a modified war edition of its predecessor, but retains the normal peacetime advice on cultivation, manuring, etc., in the hope that as close adherence as possible will be given to its recommendations. It deals with the cultivation of the following: gooseberries, black and red currants, raspberries,

loganberries, blackberries, miscellaneous berries, figs and the pollination of small fruits. Among the miscellaneous berries on which very brief notes are given, are Phenomenal berry, Newberry, Youngberry, the Lucretia dewberry, Veitchberry and Laxtonberry.

2014. WHITEHEAD, G. E. 635.64 + 635.8
Tomatoes, mushrooms and other choice food-crops.

A. & C. Black, London, 1944, pp. 92, 3s.

This little book is intended for the garden enthusiast who has tired of the more mundane vegetables and is prepared to grow the more delectable but difficult kinds. Space has not permitted of a full treatment of each crop and so, while the author describes in some detail soil preparation and culture he dismisses the numerous pests and diseases that may cause total loss of these types of vegetables in inadequate and occasionally inaccurate words. The section dealing with hotbeds is excellent and for forced crops the author makes helpful, practical suggestions. It is to be doubted whether the average gardener will have such lavish supplies of manure and loam as Mr. Whitehead uses to raise his own excellent crops, and in this respect the book is unsatisfactory as its recommendations are more readily applicable in the larger private garden than by the enthusiastic but inexperienced amateur for whom they are made. The other "choice" crops are cucumbers and melons, while a chapter is devoted to greenhouse cultivation of dwarf beans, potatoes, rhubarb, seakale and chicory.

H.M.H.

2015. U.S. DEPARTMENT OF AGRICULTURE (BARNES, H. V.) 016: 63(73)

List of bulletins of the agricultural experiment stations for the calendar years 1941 and 1942.

Bibl. Bull. U.S. Dep. Agric. 4, 1944, pp. 70.

In this yearly publication titles are given in numerical order of bulletins issued by each station. There is a subject and author index.

2016. REBOUR, H. 634.1/8(65)
Comptes rendus de l'expérimentation fruitière en Algérie, année 1942. (Report on fruit investigations in Algeria in 1942.)
Bull. Inspect. gén. Agric. algér. 92, 1943, pp. 47.

This report is drawn up from information afforded by horticultural advisers in different parts of Algeria. Among subjects discussed are the following. *Infertility of the Clementine orange.* A definite cause for the infertility of the Clementine is yet to be found, the phenomenon occurring under many contrary conditions at different places. It may be noted, however, that in a few plantations there are old Clementines 30-40 years old which give a regular crop each year. Moreover, observations in younger plantations show here and there a few trees with a tendency to regular cropping. It is suggested that a plantation should be made exclusively of trees propagated from scions of known, regularly cropping trees and that the behaviour of the trees in it should be carefully watched. The variety appears to be an unstable hybrid and very delicate in all respects and to have degenerated very quickly as the result of inadequate selection of budwood. *Olive varieties. Irrigation problems in the Oran district. Cultivation of pears and apples as cordons.* Cordon growing is not recommended for Algerian conditions except by experts, excessive insolation being a serious problem. *Fig pruning. Dehydration and drying of turnips and varietal suitability.*

2017. I.N.E.A.C. 633/635: 551.566.1(675)
Rapport pour les exercices, 1940 et 1941. (Report on experimental work of I.N.E.A.C. Stations.)

Institut national pour l'Étude agronomique du Congo belge, Leopoldville, 1943, pp. 152, 50 francs.

The regional laboratory at Bambesa, acting for the central laboratory at Yangambi, still under construction, was chiefly

concerned with certain pests and diseases of cotton and maize and with pests of *Hevea*, coffee, citrus and kapok. The regional laboratory for the Mulagu district has isolated *Colletotrichum coffeanum* from the green cherry, and from the flower buds and shoots of coffee when these organs were to the eye still uninfected. Thus an organ artificially infected for experimental purposes may, unknown to the operator, already contain a latent infection. The value of preventive sprays after the fruits have set is accordingly doubtful. Degrees of susceptibility between varieties have been established, Mysore being the most susceptible and Local Bronze the least so of the coffees at this station. The *Cinchona* seed beds have suffered much from *Rhizoctonia*. Disinfection of seeds has proved difficult in practice. Disinfection of the seed beds with bichloride of mercury or formalin delayed but did not prevent infection. Clonal differences in germinative power have become apparent. At the regional laboratory at Gandajika incidence of rosette of groundnut (*Arachis hypogaea*) was entirely dependent on aphid distribution. No immune plants were found. The Field Divisions comment on a number of experiments with various crops, mostly too recent for results to be worth recording. The various experiment stations and gardens, of which there are at least 20, each staffed by one or two Europeans, contribute brief reports on their work and its results.

2018. CAMPDEN RESEARCH STATION.
664.85.036.5 + 664.84.036.5
The Annual Report of the Fruit and Vegetable Preservation Research Station, Campden, 1943, 1944, pp. 53.

During 1943 it was again necessary to subordinate research to some extent to the investigation of urgent industrial problems. Thus the first two articles cited below concern work for the welfare of the troops and work necessitated by the loss of Malaya and its tin. The report contains the following articles: Hirst, F., and Adam, W. B. Potatoes for canning. Effect of soil and variety, pp. 11-5; Adam, W. B., and Dickinson, D. The use of black plate ends for canned, fruits and vegetables, pp. 16-33, bibl. 7; Adam, W. B. The use of the spherometer in tests on hydrogen swells, pp. 34-9, bibl. 3; Dickinson, D. The internal corrosion of cans—Progress report 1, pp. 40-7, bibl. 3; Adam, W. B., and Dickinson, D. Observations on the discoloration of canned peas, pp. 48-53.

2019. NATIONAL RESEARCH COUNCIL OF CANADA, AND OTHERS.
664.84 + 664.85(71)
Report of the Canadian Committee on Food Preservation for 1943, 1944, pp. 73, mimeographed.

Dehydration. Fruit and vegetables. MacArthur, M. A. Summary of unpublished work on dehydration (pp. C. 6-8). Includes notes on packaging of spinach; results of quality tests; keeping qualities at different temperatures and in different atmospheres of cabbage, carrots, turnips and potatoes. Data available indicate that for maximum longevity dehydrated vegetables should be blanched sufficiently, treated with sulphur, dried to a low moisture content, packed in a CO₂ atmosphere, sealed hermetically and stored at a reasonably low temperature. Johnston, F. B. Rapid moisture determinations in dehydrated vegetables (p. C. 9). Details given of a chloroform distillation method. Jones, A. M. Microbiological studies of dehydrated vegetables (pp. C. 10-1). *Engineering*. Eidt, C. C. Recent developments in the field of dehydration (pp. C. 31-3). Discusses recent methods used for peeling vegetables, namely, lye peeling and steam peeling, 3 methods of multi-stage drying and the final compression of the finished product. Woodcock, A. H. Electrical moisture testers for dried foods (pp. C. 33-4). *Canning and packaging. Fruit and vegetables.* Phillips, W. R. Compression of dehydrated vegetables (p. E. 1). *Refrigerated storage and transport.* Phillips, W. R. Fruit and vegetables (pp. F. 1-3). Overloading of stores leads to

increased temperatures in store and so may result in core flush and senile breakdown in apples. Initial stages of a rootstock trial at Ottawa show that rootstock has a great influence on storage behaviour. Early results suggest that Anis and M. IX produce the best keeping and M. III produces the poorest keeping apples. Trials with celery show the best storage temperature to be the lowest obtainable without danger of freezing, viz. 31° F. where spatial variation is low. A continuation of tests with consumer packages has proved their use as containers for apples. Packing seed carrots and beets in slightly dampened sphagnum moss helps to retain moisture and has no serious results. Temperatures of 36° to 32° F. are advantageous in the subsequent seed production of the stecklings.

2020. EAST MALLING RESEARCH STATION. 634.1/7
Annual Report of the East Malling Research Station for 1943, A27, 1944, pp. 114.

Section I (pp. 11-14) contains notes of work on the experimental farm, Section II (pp. 15-30) is a general review of work of the different departments and includes a list of publications by members of staff. The articles in Sections III and IV, Research reports, and Bulletins for fruitgrowers respectively, are separately abstracted.

2021. TAFO, GOLD COAST (GREENWOOD, M., AND OTHERS). 633.74(667)
Report of the Central Cocoa Research Station, Tafo, 1938-42.
Dep. Agric. Gold Coast Colony, 1943, pp. 63, bibl. 45, 48.

A summary of the work carried out at the recently established Cocoa Research Station at Tafo between March 1938 and December 1942. *Agronomy* (F. I. Squibbs). Various trials and recordings are noted, from which some results of agricultural interest emerge. A depressant effect of vertical shade on average girth per tree and number of pods per tree and per plot was observed, though trees under shade have shown a lower rate of mortality (2½% shaded, 4% unshaded) over a period of 2 years. No "best" planting distance could be determined and probably there is no such thing, even for a given locality or soil type. The local method of random close planting and allowing the trees to thin themselves as they mature is as good as any. The native farms in the boundaries of the Trial Area have been much affected by swollen shoot disease and were treated by excision of affected and contiguous trees to a depth of 200 yards. There were 63 outbreaks involving the removal of 736 infected and 1,134 contact trees in the Trial Area itself. The mean annual girth increase for 3,091 bearing trees was 0.6-0.5 in. for trees of 2-15 in. girth, and 0.4-0.2 in. for larger trees up to 31 in. An itemized cost of production record shows that an annual profit of £2 per acre should be obtainable from an average native farm employing entirely outside help. Progeny trials are being used during establishment for various minor experimental treatments to determine the value of various kinds of temporary or permanent shade. A trial at Akwadum on 25 acres of derelict farm in the heart of the main diseased area has as its aim the re-establishment of cocoa in an area denuded by swollen shoot and includes ring hedging to hamper the spread of the disease, spacing and shading. A rejuvenation trial at the station on 6 acres of the oldest cacao available aims at determining the quickest and cheapest method of restoring farms, declining through age and soil exhaustion. Treatments are mulching, legume cover cropping, coppicing with plantain shade, stumping and replanting under *Leucaena* shade. Manurial trials so far indicate, though not significantly, an improvement from phosphates in the case of older bearing trees (average 18-20 years, girth 14 in.). There are no results yet recorded from young cacao trials. *Botany* (A. F. Posnette). Selection for quality and yield has been replaced since 1940 by a search for trees resistant to capsids and virus disease. Notes are given on the yield and quality types so far provisionally selected. Farmers are to be

supplied with seed only, it being unlikely that they would give cuttings or buddings the proper attention. Progeny trials of hand-pollinated seed are in progress with a view to fixing genuine high-yielding strains. All selected trees are immediately reproduced by bud-grafts or cuttings, for the original selection is in present circumstances quite likely to die of swollen shoot or root disease. Twelve acres of budded clones for seed production have been established. The clones will be observed meanwhile in regard to yield, disease and pest resistance. A tree, S.C. 1, has been discovered and extensively propagated which is apparently resistant to capsid (*Sahlbergella theobroma*). Another selection, S.S. 167, shows tolerance to swollen shoot virus and is being propagated, as is a high yielding hybrid, A.H. 22, that has also resisted artificial infection. Propagation by means of cuttings was improved in 2 small tests when black cloth was wrapped round the shoot for a month before severance. More rapid and more profuse rooting resulted. Unshaded trees flush more frequently than shaded trees, but the flushes are small, 1 to 6 twigs. Significance is lost when heavy flushes are included. The exclusion of *Sahlbergella* capsid caused a greater frequency of small flushes, though few were prolonged into main flushes. Total damage due to capsid was greater on unshaded plots, but severe damage was significantly greater on shaded plots and flushing was thereby reduced. Artificial overhead shade stimulated chupón growth in place of fan growth and reduced flushing in degree but not in frequency. *Chemistry* (M. Greenwood). Comparative measurements of evaporation and radiation above and below the canopy, air and soil temperatures, relative humidity, soil moisture and light intensity, made at Tafo under heavy forest shade, artificial shade and no shade, have been compared with values obtained on a good Trinidad estate. The evaporation rate is lower throughout the year whilst the range of available moisture is the same. The data obtained are fully set out and discussed. The soils of the station are described. Iron chlorosis symptoms have appeared where plant ash has been incorporated in planting holes and where the lower calcareous horizons of termite mounds have been brought to the surface. A sickle leaf distortion and mottling is associated with high alkalinity and a high content of available phosphate. It can be induced by the contiguity of rotting heaps of cacao pods and by the application of cacao ash (soluble constituents being potassium carbonate and potassium phosphate). *Entomology* (G. S. Cotterell). Control of *Sahlbergella* capsid, and studies of the cacao psyllid, *Mesohomotoma tessmanni*, and other suspected vectors of swollen shoot virus gave positive results with the psyllid, 2 mealy bugs and the cacao aphid, *Toxoptera aurantis*. Fourteen other species gave no indication of transmission. A list is given of various experiments in being or projected in connexion with the psyllid vector. *Pathology* (A. F. Posnette). Research on cacao diseases has been almost entirely confined to the swollen shoot disease. An account is given of the symptoms.* These take from 10 to 20 weeks to develop after infection. "The heat inactivation point of the virus in budwood corresponds with the lethal point for the budwood itself. There are several strains of swollen shoot and probably more than one virus infecting cacao and the range of symptoms closely parallels that of the peach virus complex. A study of the relationship between the 2 viruses indicates that the "Bisa" type is a mild strain of swollen shoot virus and can confer some degree of immunity against the prevalent virulent strain "New Juaben". There is a third virus which produces mottle leaf which does not confer immunity on either of the others. Other virus strains are under investigation. Previous experiments prior to 1940 are recapitulated. Seed transmission occurs rarely, if at all. The disease has never been fully controlled by cutting out infected and adjacent trees, but it has been kept in abeyance.

* The symptoms are well described by Voelcker and West, see *H.A.*, 1942, 12: 1041.

2022. JAMAICA. 634.771-2.4
Annual Report of the Department of Agriculture, Jamaica, for the year ended 31st March, 1943, 1944, pp. 20.

Some results of investigations are reported. The most important observation made during the year was the association of abnormally heavy ascospore infection by *Mycosphaerella muscicola*, banana leaf spot, on certain soils between March and August when ascospore infection should normally be at a minimum. In a field in which the pH varied from place to place the bananas growing on the highly acid parts of the field were very heavily infected in summer in spite of a 3-weekly 4-4-40 bordeaux spraying, while those within 80 yards on a less acid soil were under excellent control. Subsequent observations show that the leaf spots of bananas on highly acid Jamaica soils produce perithecia abundantly throughout the year. The normal metabolism of the banana plant must be altered to such an extent on these soils that the metabolism of the parasite is likewise affected. Heavy, ill-drained clay soils also encourage excessive production of perithecia in the ascospore season. Lime applications to the soil gave no encouraging results and it was found that highly alkaline soils of poor fertility will also sometimes give abundant, out of season production of perithecia. No correlation could be established between the phosphorus content of the soil and the abnormal production of perithecia. The whole subject of the effect of soil conditions on perithecial production is of the utmost importance to summer spraying schedules. Mention is made of a banana, SA 1, produced by the Department, of potential commercial value and said to be immune to Panama disease and highly resistant to leaf spot.

2023. COFFEE BOARD OF KENYA. 633.73(676.4)
Annual report and accounts of the Coffee Board of Kenya for the year ended 31st March, 1944. Mon. Bull. Coffee Bd, Kenya, 1944, 9: 39-45.

The report largely concerns administrative matters. The Board's liquorier gives some account of his work and methods and there are brief notes on current conditions relative to their duties by the technical officers of the Coffee Services.

2024. LONG ASHTON RESEARCH STATION. 634/635
Annual Report of the Long Ashton Agricultural and Horticultural Research Station 1943, 1944, pp. 172.

The period covered by the report has seen the retirement of Professor B. T. P. Barker and the appointment of Dr. T. Wallace as director of the research station. Notes of this and other changes and of research activities are given on pp. 7-14. The rest of the report is devoted to articles by members of staff. Those concerned with horticulture are separately abstracted in this number.

2025. D.S.I.R., NEW ZEALAND. 634/635 + 664.85(931)
Eighteenth Annual Report of the Department of Scientific and Industrial Research, New Zealand, for 1943-44, 1944, pp. 57, 1s. 3d.

Fruit cold storage. Gas storage trials continued with Jonathan and Sturmer apples. There are indications that optimum conditions for Sturmer are a temperature of 38° F. and an atmosphere containing 5% CO₂ and 10% O₂. Fruit stored thus is vastly superior in colour, hardness and general quality to the air-stored controls. Maximum susceptibility of Granny Smith to superficial scald occurs from the 9th to the 12th weeks after the start of storage. Oiled wraps prevent the occurrence of the scald. Determinations are now in progress as to the length of time in which it is possible safely to leave the variety without oiled wraps on either side of this period of maximum susceptibility. Delayed storage tests are in progress. Details are given which indicate the varying effects of different fertilizer treatment on cold-storage quality in Cox's Orange, Dunn's

Favourite, Jonathan, Delicious and Sturmer. In a young rootstock trial at Appleby Jonathan fruit grown on M. XII was much less subject to internal breakdown than on Northern Spy or on M. I and M. XV. Experiments both this and previous years confirm the practicability and economy of using a case-lining of waxed paper in packing cases as a preventive of shrivel in cold-stored pears liable to shrivelling. Waxed lining paper also greatly reduced wilt in cold-stored Sturmer apples.

Fruit research. Manurial trials with Cox's Orange, Dunn's Favourite, Delicious and Sturmer continue. Some 500 stocks of Malling XII and XVI have been sent to the nursery of the N.Z. Fruitgrowers' Federation [at Levin, presumably] to establish new propagation beds for future production in bulk. Details of different results from the use of the different Malling stocks as compared with Northern Spy continue to be noted. Selection has been made of strains of Delicious and of Cox's Orange. Brown rot losses in apricots have been reduced by dipping in Shiran A.G. Plum bacterial spot is under investigation; all 12 peach varieties tested proved susceptible to this disease. Rootstock trials are being continued of Washington Navel on sweet and sour orange, citronelle and trifoliate rootstocks. Bud selection-committees have been formed in the chief fruitgrowing areas, their function being to select the best available stone and pomé fruit tree budwood for use by the Federation nurseries. Fruit work at the Cawthron Institute has included investigations into magnesium deficiency in apples, micro-chemical analysis, distribution of Mg and K in leader growth, apple juice concentrates, apple manuring—on discontinuing these after 20 years, PNK-treated trees were found to be much the best, and N-treated trees the worst. Other work at Cawthron shows 12-year-old Statesman apple trees worked on Double Vigour to be bearing more fruit than those on Northern Spy. Codling moth parasites *Ephialtes candatus*, *Aenoplex carpocapsae* and *Cryptus sexannulatus*, especially the first, are being studied.

Plant Research Bureau's activities. The Botany division continues to work on phormium, hemp, cabbage tree leaf and linen fibres; on seaweeds; weeds; poisonous plants and medicinal plants; vegetable seed production, especially beetroot, cabbage and lettuce; kok saghyz cultivation, teal cultivation, soil erosion. The rubber content of the kok saghyz plants (green weight) varied on the average from 1.6% to 2.4%. A plot at Nelson which received 500 lb. (per acre) "tomato" fertilizer on one half and 300 lb. superphosphate on the other yielded at the rate of 279 lb. and 245 lb. rubber per acre respectively. As the result of the work of the Entomology Division *Angitia cerophaga* and *Diadromus collaris* are well established and generally exercising good control over the diamond back moth (*Plutella maculipennis*). Under the Plant Diseases Division various small fruit, vegetable and drug plant diseases are being investigated. A strain of *Cladosporium fulvum* has appeared to which Vetomold tomato is not resistant. Efforts are directed towards finding a resistant strain of *F. Vetomold*.

Tobacco Research. Work is in progress on nutrition, mosaic and other diseases, seed production, curing and soil mapping.

2026. NEW JERSEY. 63(749)
63rd Annual Report New Jersey Agricultural
Research Station for 1941/42
(Farm science goes to war), 1942, pp. 132.
64th Annual Report New Jersey Agricultural
Research Station for 1942/43
(Ploughshares and swords), 1943, pp. 62.

In the first of these reports information is given in the form of question and answer, in the second by short notes on work done on different crops. Both are popular in their appeal. Both show that considerable work is in progress. Lists of publications on particular subjects are included.

2027. SALISBURY AGRICULTURAL EXPERIMENT STATION.
(ARNOLD, H. C.). 633/635(689.1)
Annual Report of Experiments at the Salisbury
Agricultural Experiment Station, season 1942-
1943.

Rhod. agric. J., 1944, 41: 208-25.

Reports are given on methods of utilizing sunn hemp crops for the restoration of soil fertility, on the effect of various manurial treatments on seed production in maize, soybean and sunn hemp, on variety trials of groundnuts, soybeans, velvet bean hybrids and sweet potatoes.

2028. ZANZIBAR PROTECTORATE.

633.832 + 634.774(678.1)

Annual Report of the Zanzibar Department of
Agriculture for the year ended 31st Dec. 1943,
1944, pp. 6, price 75 cents.

Some results of experiments are mentioned. In manurial experiments with cloves, laid down with new seedling trees in 1935, a dressing of 2 lb. sulphate of ammonia per tree on saplings which had been 8 years in the field led to a response of 1.5 lb. of dry cloves per tree equal to a return of 21.00 shillings per acre for an expenditure in manure of 19.00 shillings. At present the cost of fertilizer is unduly high. A correlation was obtained between girth and yield of trees in this manurial trial [see also *H.A.*, 13: 602]. Copra meal applied in trenches near the base of the tree at the rate of 12 lb. and 25 lb. per tree gave increased, but not significant, yields. No evidence could be obtained that the manuring of clove seedlings with artificial fertilizers is of any value before the third year in the field. The coconut manurial and cultivation trial recorded for the first 10 years gave no results, probably owing to unsuitable environment in which the trees were growing. Pineapple manurial trials in their fourth season gave significant response to potash and to N+K [see also *H.A.*, 13: 619]. The spacing trials finished after 4 years in favour of close planting, 12,906 plants per acre. The third ratoon crop was hardly worth picking and an experiment has now been laid down to establish the number of ratoon crops which can profitably be taken before replanting. Attention is called to a recent paper by officers of the Department [Briant and Tidbury, *E. Afr. agric. J.*, 1944, 9: 154-5, *H.A.*, 14: 898] in which a graph was constructed which indicates the approximate percentage of a sample of pineapples over a certain critical weight when the total weight and number of fruit is known. The graph would be of use in assessing the commercial value of experimental field treatments and for factories purchasing large quantities for slice canning.

2029. IMPERIAL AGRICULTURAL BUREAUX. 633.913
Cultivation and breeding of Russian rubber-
bearing plants.

Mimeograph Imp. Bur. Plant Breeding and
Genetics, Cambridge and of Horticulture and
Plantation Crops, East Malling, 1944, pp. 53 + 3,
2s. 6d.*

An account of the search for and investigation of the rubber-bearing plants of Russia. The cultivation and subsequent processing of *Taraxacum kok saghyz*, the most promising of the native species, is dealt with at length.

2030. The following reports have also been examined:
(4)

A.R. Dep. Agric. Northern Rhodesia for the year
1943, 1944, pp. 10.

A.R. Dep. Agric. Palestine for year ended March
31, 1943, being No. S.4 of 1944, pp. 8.

A.R. Dep. Agric. Tanganyika Territory for 1943,
1944, pp. 7.

A.R. Dep. Agric. Uganda Protectorate for the
period 1 July 1942 to 30 June 1943, 1944, pp. 12, 1s.

* Obtainable from I.A.B., Central Sales Branch, Penglais,
Aberystwyth.

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